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THE 59th ANNUAL MEETING FLORIDA ACADEMY OF SCIENCES

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Program Issue

Volume 58 Supplement 1

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THE 59th ANNUAL MEETING FLORIDA ACADEMY OF SCIENCES

MAY 19-20 (Fri. & Sat.), 1995

Co-Sponsors:
THE FLORIDA ACADEMY OF SCIENCES
&
THE AGENCY FOR TAMPA BAY MANAGEMENT

A CONFERENCE ON WATER

UNIVERSITY OF TAMPA
TAMPA, FLORIDA

Meeting jointly also:
Society of Women Engineers,
Pinellas Section and USF Student Section
American Association of Physics Teachers, Florida Section

Annual Banquet Address by 1994 Florida Medalists:
Dr. Dean and Barbara Martin, University of South Florida.

TOPIC:
Travelling Chemists

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((B) by session indicates Business Meeting)

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Symposia:

- Strengthening the Science, Engineering and Mathematics Chain of Success Through Partnerships
- Developments at HBCUs to Advance Environmental Justice

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THURSDAY EVENING, MAY 18, 1995

6:30	FAS Council Meeting Science Center 303

FRIDAY MORNING, MAY 19, 1995

7:15	Registration (to 4:00 pm) Plant Lobby
8:00	Anthropology, Session A Plant Hall 237A
	Anthropology, Session C (B) Plant Hall 209
	Physics and Space Sciences, Session A (B) Plant Hall 240
	Urban and Regional Planning, Session A (B) Plant Hall 231
8:30	Geology/Hydrology, Session A (B) Plant Hall 246
8:45	Biology, Session A (B) Plant Hall 215
9:00	Environmental and Chemical Sciences, Session A (B) Plant Hall 210
	Science Teaching, Session A Plant Hall 248
9:30	Symposium, Strengthening the Science, Engineering and Mathematics Chain of Success through Partnerships Lecture Hall -1
9:30	Coffee Break Plant Ballroom
10:45	Engineering, Session A (B) Plant Hall 225
12:00-1:00	Poster Session Plant Lobby
12:00-1:00	Complimentary Lunch for Registered Attendees Plant Ballroom

FRIDAY AFTERNOON, MAY 19, 1995

1:00	**Plenary Session and Annual Meeting:** **Water Supply Issues in West-Central Florida** Lecture Hall-1
2:45	Anthropological Sciences: SYMPOSIUM, Session B Plant Hall 237A
	Biological Sciences, Session B Plant Hall 215
	Biological Sciences, Session C Plant Hall 217
	Biological Sciences, Session D Plant Hall 213
3:00	Environmental and Chemical Sciences, Session B Plant Hall 210
	Florida Committee on Rare and Endangered Plants and Animals Plant Hall 208
	Physics and Space Sciences, Session B Plant Hall 250
	SYMPOSIUM: Developments at HBCUs to Advance Environmental Justice Lecture Hall-1
3:15	Science Teaching, Session B (B) Plant Hall 248

FRIDAY EVENING, MAY 19, 1995

6:30	Reception for Medalists Plant Ballroom
7:00	Banquet Plant Ballroom
8:00	Medalists' Lecture Plant Ballroom

SATURDAY, MAY 20, 1995

9:00	AAPT Registration Science Center 303
9:30	AAPT Session A - Invited Presentation Demonstrations by Dr. Henni van Rinsvelt, UF Science Center 303
11:00	Florida-AAPT Business Meeting and Election
1:00	AAPT Session B Science Center 208
	AAPT Session C Science Center 211
	AAPT Session D Science Center 233B

WELCOME

Patricia M. Dooris, 1994-95 President

Welcome to the 59th Annual Meeting of the Florida Academy of Sciences. The theme of this year's meeting is "Water," a commodity critical to the well-being of each of us and to that of our great state. I sincerely hope that you find in this meeting something that we as scientists all value—knowledge and understanding of significant issues, in this case, water issues.

Joining us in co-sponsoring the program this year is the Southwest Florida Water Management District which has graciously printed the Program Issue which you hold in your hands. In addition, two consulting firms which provide considerable expertise in the field of water resources, HDR Engineering, Inc. and Montgomery-Watson, Inc., have provided generous contributions to our meeting, To these and to our host, the University of Tampa, we express genuine thanks and appreciation.

MEETING INFORMATION

* Papers: Some papers are marked with a * to indicate that they are on the meeting theme of "Water." For information about the program, contact the Program Chair, Dr. R. Del Delumyea, Jacksonville University, Jacksonville, FL 32211, 904-744-3950 X7332.

The Chair of the Local Arrangements Committee is Dr. Stan Rice, (803) 253--3333 ext. 3340. Special arrangements (including handicapped services information) should be discussed with him prior to the meeting.

Information about the Florida Academy of Sciences may be obtained from the Executive Secretary, Ms. Betty Preece, P.O. Box 033012, Indialantic FL 32903-0012; phone (407) 723-6835.

LOCATION

Located on the banks of the Hillsborough River across from the downtown district, The University of Tampa is strategically positioned for easy access to and from all of west central Florida. The University was founded in 1933 in historic Plant Hall, the main academic and administrative building. Formerly the grand and luxurious Tampa Bay Hotel built by the shipping magnate Henry B. Plant in 1891, Plant Hall remains the symbol for the City of Tampa and the site of this year's Florida Academy of Sciences meeting. The University will be in Summer Session; however, parking is no problem.

To reach campus: from North Florida, take I-75 south to I-275 (south), continue south through Tampa to the junction of I-275 and I-4; remain on I-275 (toward St. Petersburg) and exit at Ashley Street (the first exit after the junction with I-4). From Northeast and Central Florida, Take I-4 to the junction of I-4 and I-275 in downtown Tampa; stay on I-275 south (towards St. Petersburg) and exit at Ashley Street, the first exit after the junction of I-4 and I-275; from South Florida, take I-75 north to I-275 north; follow I-275 north through St. Petersburg and across Tampa Bay; as you approach downtown Tampa, exit at Ashley Street. Follow Ashley Street south to Kennedy Blvd (about 5 blocks) and turn right (west) on Kennedy Blvd. The main entrance to campus is at the first traffic light just beyond the Hillsborough River bridge on the right hand side (north) of Kennedy Blvd. You will see the silver towers of the University on the right as you cross the river.

LOCAL AREAS OF INTEREST AND FIELD TRIPS

The greater metropolitan area surrounding Tampa Bay offers numerous opportunities for recreation, sight-seeing, and entertainment. Detailed information will be available at the registration table at the meeting. A few of the attractions located within easy reach from the meeting site include:

Busch Gardens - A world-class zoological garden, zoo, and entertainment facility located in north Tampa on Busch Boulevard a few miles east of I-275. Admission is about $30 per person.

The Florida Aquarium - A new, state-of-the-art public aquarium focusing on the aquatic habitats of Florida. The aquarium is located a few blocks from the University campus southeast from the downtown district. Admission is about $14 per person.

Lowry Park Zoo - Recently rebuilt and expanded, the zoo is one of the best bargains in town. Animals are housed in natural surroundings for easy viewing with an extensive manatee facility and numerous other endangered species exhibits. Admission is about $6 per person.

Museum of Science and Industry - Located across the street from the University of South Florida on Fowler Avenue, the museum offers numerous educational and hands-on displays. Admission is about $6 per person.

Lettuce Lake Park - This park and natural wilderness area is located on a wide portion of the Hillsborough River just east of the University of South Florida on Fletcher Avenue. All types of terrestrial, aquatic, and flying wildlife are commonly encouraged along an extensive network of boardwalks and trails. Admission is free although donations at the entrance are encouraged.

REGISTRATION

All participants, including presenters and session chairs, are expected to register. A registration desk will be open in the Plant Hall lobby from 7:15 am to 4:00 pm on Friday, May 19. The on-site registration fee is $61.00 for regular members, $86 for non-members, and $41 for students. Members receive the program issue by mail, as will others registered by April 1, 1995. Extra programs cost $4.00.

LODGING

No reservations can be made through the Academy. A limited number of on-campus dormitory rooms will be available for Thursday and Friday nights, May 18 and 19. Room requests for on-campus housing were mailed along with the meeting registration materials and will be assigned on a first-come, first-serve basis. Dorm rooms will cost $15.50 per night plus $5.50 for linens. Contact the local arrangements chair, Dr. Rice, for information.

Additional off-campus housing is available at the following locations and should be reserved through direct contact with the hotel. Be sure to mention the University of Tampa and the FAS to get the discount rate.

Holiday Inn - 1 mile from campus, $65 per night, (813) 223-1351.
Quality Hotel Riverside - Across the river from campus, $59 per night, (813) 961-1000.
Ramada Inn - 9.5 miles from campus on Bears Avenue off I-275, $45 per night, (813) 961-1000.
Days Inn - 8.5 miles from campus, Fletcher Avenue off I-275, $42 per night, (813) 977-1550.
Budgetel Inn - 8 miles from campus at the US 301 exit from I-4, $34.95 per night, (813) 626-0885.

Field trips and visits to scientific locations in the Tampa area will be organized. Details of these will beavailable in the registration area or by contacting the local arrangements chair.

ACADEMY BANQUET and other MEALS

Food services will be available on Friday for breakfast.

FRIDAY LUNCH: A buffet lunch will be served on the University of Tampa campus to all REGISTERED attendees on Friday Noon.

FRIDAY BANQUET: A social hour (non-alcoholic) precedes the banquet on Friday Evening. Due to limited seating (140 max), all banquet reservations MUST be made and paid for with pre-registration no later than April 1, 1995. The cost of the banquet is $20. The Meeting Registration Fee does not include the cost of the Academy Banquet. The banquet includes an entree (vegetarian or meat) plus a tossed salad, mixed vegetables, rolls, coffee, tea and assorted desserts.

FAS COUNCIL MEETING

The annual meeting of the Council of the Florida Academy of Sciences will be held on Thursday Afternoon, May 18, 1995, 6:30-9:00 PM. The Annual Meeting of the Academy is Friday afternoon.

FLORIDA JUNIOR ACADEMY OF SCIENCES MEETING

The Florida Academy of Sciences will not meet with the Junior Academy this year. Their meeting was held at Brevard Community College in Melbourne, March 17, 1995.

COMMERCIAL AND INSTITUTIONAL EXHIBITS

Exhibit space is provided free of charge to non-profit organizations within the Sciences. Exhibitors to date include: the Southwest Florida Water Management District, Keep Pasco Beautiful, the Busch Gardens Conservation Information Department, and the Tampa Museum of Science and Industry. The Museum will offer discount tickets during the weekend to persons mentioning the FAS meeting. Other organizations will be present as well.

INFORMATION FOR SPEAKERS

All rooms have overhead projectors and screens. Speakers wishing to use slides should verify with their session chair that a projector will be provided for that session. Speakers requiring special equipment must contact the chair of the local arrangements committee. Student speakers should identify themselves to the session chair prior to speaking. The Audio-Visual room for the conferences will be SC225.

If an author or co-author is scheduled to speak but cannot attend due to unforeseen circumstances, arrangements should be made for a colleague to present the paper. If a reader cannot be found, the paper should be cancelled. The Academy must be notified of a substitute speaker or cancellation, by contacting the appropriate section chair.

A Speaker's Room will be set up in Plant 1 Hall, Room SC310, where presenters can review their slides and notes, relax, write and so forth. An overhead projector and slide equipment will be available there. Speakers may wish to check that their slides are correctly mounted. This room will be unlocked and unsupervised.

STUDENT AWARDS

Students presenting papers at the Annual Meeting of the Academy may be considered for a number of awards. Two special new awards for presentation of a paper in the Engineering Section by a student member of the Society of Women Engineers have been announced for the 1995 Annual Meeting. First place and runner-up cash awards will be made. Contact Dr. Carl Luer, FAS Awards Chairman, 813-388-3474, for further details.

PUBLICATION

All accepted abstracts will be published in the Program Issue of the *Florida Scientist* (Volume 58,

Supplement). It will be distributed to over 200 domestic and foreign libraries as well as major abstracting services.

SPECIAL SYMPOSIA AND SESSIONS

SYMPOSIUM Friday, May 19, 1995, 9:30 a.m., Rm. LH-1: Strengthening the Science, Engineering and Mathematics Chain of Success Through Partnership. A structured collaborative approach appears to pay high dividends in the enhancement of the education of future scientists, engineers and mathematicians. Two programs which use this approach are the SouthEastern Consortium for Minorities in Engineering (SECME) and the Florida-Georgia Alliance for Minority Participation (FGAMP). In addition to fulfilling their respective missions, these programs facilitate transition at all levels of the educational pipeline. Both programs have linkages with the private sector as well as state and national agencies and universities. This partnership approach has already heightened interest in science, engineering and mathematics (SEM) careers as evidenced by the increase in the number of SEM majors matriculating at participating institutions.

This symposium will provide an opportunity to share successful strategies adopted by the two programs. Presenters include SECME and FGAMP personnel and partners. **Sponsors FGAMP & SECME.**

Facilitator: Ralph W. Turner, Institutional Coordinator, FGAMP @ Florida A&M University.
Presenters: R. Guy Vickers, Executive Director, SECME

G. Iris Threatt, Science Academic Coordinator, FGAMP @ Bethune- Cookman College

Gustavo Roig, Institutional Coordinator, FGAMP @ Florida International University

Teodore Jones, Equal Employment Opportunity Officer, St. Johns River Water Management District

SYMPOSIUM Friday, May 19, 1995, 3:00 p.m., Rm. LH-1: Developments at HBCUs to Advance Environmental Justice. Representatives from Florida's Historically Black Colleges and Universities will discuss their programs and researches within their communities.

Presenters: Dr. Nicholson (Bethune Cookman College). "Establishment at B-CC, the Environmental Health Evaluation Laboratory and Its Potential Use to Evaluate Pollution Conditions in Minority Communities."

Dr. Webb (Edward Waters College). "Household Toxic Wastes and a Program De signed to Reduce wthe Pollution Problem."

Dr. Shackleford (Florida A&M University). "Electromagnetic Fields in Minority Com munities Friand Need for Evaluation.

Dr. Hopper (Florida Memorial College). "Hazardous Waste Sites and Potential Water Pollution Problems."

SYMPOSIUM Friday, May 19, 1995, 2:45 p.m., Rm. PH237A: What Does Science Say About Human Variables? SESSION ABSTRACT: Human scientists a century ago tended to confirm a European cultural belief that humans could be usefully categorized into basic types. Thus, they provided some scientific legitimacy to that particular classification by giving those types such labels as Caucasoid, Mongoloid, and Negroid and calling them "races". As the methods of physical/biological anthropology

improved it became clear that human variation is much more complicated than that. However, once those "races" became fixed in our cultural institutions, even in law and religion, it is proving difficult to discard such simple and misleading classifications and to substitute more useful concepts that are based on more evidence and more detailed analysis. Over the years, and even today, the concept of race has contributed far more to misunderstanding and conflict than it has to understanding and cooperation. **What does anthropology have to say on this today**?

Papers: Scientists' Views on Human Variation: Introduction to the Symposium. Alvin Wolfe (USF)

The Distribution of Human Variation. Alvin Wolfe and Lorena Madrigal (USF)

Pure Races, Pure Fiction: Migration, Ethnogenesis and Gene Flow. John Moore (UF)

Race and Racism: The American Association of Physical Anthropologists Revision of the UNESCO Statement on Race. Leslie Sue Lieberman (UF)

Race, Culture and Ethnicity. Susan Greenbaum (USF)

PLENARY SYMPOSIUM AND ANNUAL BUSINESS MEETING

The Friday afternoon session (1:00 to 2:45) will begin with a plenary address by a panel of three representatives of the Southwest Florida Water Management District.The topic will be: **Water Supply Issues in West-Central Florida.** The Annual Business Meeting and elections will follow.

RECEPTION, 9:30-10:30 a.m., Saturday, May 20, Plant Ballroom:

Reception **Recognizing Women in Engineering and Sciences,** sponsored by the Society of Women Engineers. A special reception and networking opportunity to recognize women in engineering and sciences is being hosted by the Pinellas Section and the University of South Florida Student Section of the Society of Women Engineers during the FAS coffee-break hour (9:30-10:30 AM) on Saturday morning.Women professionals and students attending FAS, as well as all FAS members are cordially invited to meet with women colleagues from the Tampa Bay area in the Ballroom. Take advantage of this opportunity to become acquainted with women in your areas of interest. For more information, please contact Betty Preece, phone/FAX 404-723-6835.

8:00 am - 11:20 am, Room PH-237A
SESSION A - GENERAL ANTHROPOLOGY I
Robert J. Austin, Janus Research, Presiding

8:00 am, ANS-1A Transcultural Study of the Association Between Depression, Chronic Illness and Health Culture Among the Elderly in Three Communities. ROSEMARIE S. LAMM, PH.D. AND ALVIN W. WOLFE, PH.D., Department of Applied Anthropology, University of South Florida, Tampa 33612-3899. There is evidence of an association between depression, chronic illnesses and culture in older persons. Ethnic differences have been associated with the differences of health and mental status. There is further need to understand the relationship between ethnicity and health status. In order to better understand the association of variables, three populations of persons over fifty-five years of age were selected to study. The variables of age, presence of chronic illnesses, and culture were evaluated in populations which demonstrated integration in communities with boundaries and ethnic identity. The data collected were analyzed using the Correlation of Coefficient and significant differences in depression rates in these populations were reported.

8:20 am, ANS-2A Alcohol, Attitudes, and Associations: Cognitive Categories of Native American Youth in a Rural Community. SUSAN E. STANS, University of Florida, Department of Anthropology, 1350 Turlington Hall, Gainesville, 32611. Preliminary results for field research address the process of learning definitions of alcohol's effect by peer association. Two social groups were constructed, one from students sorting peer names by perceived similarity and the other from names with whom students said they associated. Each group was coded and compared by age, sex, reasons to drink alcohol, attitude toward use, and level of use. Ethnographic research would verify the existence of constructed groups in the community.

8:40 am, ANS-3A The Relevance of the Case Study Methodology in Anthropology: How it Differs from other Qualitative Research Methods. ANGELA GOMEZ, 1717 W. Eldred Dr., Tampa 33603. The case study methodology is analyzed from an anthropological perspective. Its versatility in the utilization of various sources of evidence makes it a desirable research method because it allows the researcher to determine what data elements are relevant to the investigation. The use of several forms of data within a single case study provides points of reference for triangulation to take place and therefore achieve internal validity. Its qualitative and quantitative background permits the elaboration of reports that are more insightful than simply presenting quantitative data. Since both the case study and the ethnography use multiple sources of evidence, they are examined in terms of differences and similarities. Strategies as to their design, data collection and analysis are discussed.

9:00 am, ANS-4A Methodological Structure of an Action-Oriented Ethnographic Evaluation: The Palmetto Beach Community Care Center. R.B. CONTRERAS, Department of Anthropology, University of South Florida, Tampa 33620. The Palmetto Beach Community Care Center, a community-based initiative, was evaluated following a methodology which combined ethnographic description through participant observation with continuous feed-back to the project staff. The purposes of the approach followed were: to permanently feed the project with information for decision-making, and to contribute to the empowerment of the project staff through facilitating critical reflection and participatory forms of inquiry. The paper discusses the methodological model utilized, its theoretical and methodological premises, the roles acquired by the researcher, and some observed outcomes in regard to description and empowerment.

* **9:20 am, ANS-5A** An Experimental Internet Delphi: Florida Water Supply Alternatives. GUY HAGEN AND MATT BROWN, Department of Anthropology, University of South Florida, Tampa 33620. Regional water supply issues are examined by experts from hydrology, geology, public administration, environmental risk perception, and anthropology. Project design was based upon a modified Delphi method, with participants communicating through remote internet access. In addition, the moderation process was automated using REXX and SAS languages on an IBM VM/CMS mainframe. Implications for water conservation and future research are discussed. Technical assistance with the SAS statistical language provided by Dr. Alvin Wolfe and Linda Wilson of the University of South Florida.

10:00 am, ANS-6A Biking to Work. SALLY WARRICK, Anthropology Department, University of Florida, Gainesville 32611. With three of Gainesville's major employers huddled near downtown (including a major university with 35,000 students), traffic congestion and parking present a problem, especially with some major roads at maximum buildout capacity. This video explores the multi-modal concept featuring the bicycle as a mode of transportation. Here six area professionals discuss their reasons for choosing the bicycle as their way to get to work. Those interviewed include: City Recycling Coordinator, City Arborist, and artist, teacher, family physician, social worker, State Director for the Traffic and Bicycle Safety Education Program, and an attorney and former city commissioner. These citizens and those like them offer one traffic solution to a community that has earned the title "eighth most bicycle friendly in the US." The increased support of local government and business will insure that others try this non-polluting commuting mode.

* **10:20 am, ANS-7A** Voting on a Way of Life: The Future of Florida's Fishing Families. SALLY WARRICK, HOLLY PAYNE, CHRISTINA ESPIROSE, MIKE KRUTZLER, AND EARL MILLER, Anthropology Department, University of Florida, Gainesville 32611. This video interviews fisher families in Mayport and Cedar Key during the time of voting on the net ban amendment. They tell what it's like to grow up families that have been fishing for a hundred years. Although Florida faces many coastal problems with increased recreational fishing, tourism, development and stormwater runoff which all lead to pollution and destruction of marine habitat (estuaries and wetlands), recreational fishers blamed dwindling fish resources on the gill and entangling nets of the inshore commercial fishers who at the time fished four and one-half days a week with over 200 regulations. The fishers stressed a willingness to work out problems but felt elevating net size to a constitutional amendment was over-reacting to their part in a complex problem with no simple solution.

* **10:40 am, ANS-8A** The Exploitation of Coastal Resources by the Inhabitants of the Yat Kitischee Archaeological Site (8PI1753), a Manasota Culture Site in Pinellas County, Florida. P.K. VOJNOVSKI, Janus Research, 2935 1st Avenue N., St. Petersburg 33731. The exploitation of Gulf coastal resources by prehistoric peoples of the Manasota Culture occupying the Yat Kitischee Archaeological site between ca. 20 B.C. and A.D. 1125 is discussed. Fishing techniques, based on archaeological evidence and ethnohistorical accounts are discussed. The results of a preliminary seasonality study based on the otoliths of the spotted seatrout, *Cynoscion nebulosus*, are presented. The results of the faunal analysis are presented and discussed in relation to other Manasota culture sites in the Tampa Bay area. This study was sponsored by the Pinellas County Board of County Commissioners, and funded by a FDHR Historic Preservation Special Category Grant. Technical assistance was provided by the Florida Marine Research Institute.

11:00 am, ANS-9A The Bone Artifacts of Yat Kitischee: A Late Prehistoric Period Coastal Hamlet. S. MITCHELL, Janus Research, P.O. Box 919, St. Petersburg 33731. Bone artifacts recovered from an aboriginal coastal hamlet located close to Tampa Bay are discussed. Various complete and fragmented bone artifacts were recovered from the Yat Kitischee site which dates to the Late Manasota and Early Safety Harbor periods (100 B.C. to 1200 A.D.). Based on the morphology and surface wear of the artifacts, this assemblage appears to represent the remains of bone tools used in everyday tasks. Bone artifact forms that are commonly recovered from prehistoric sites in Florida, decorated bone objects, and several patterns unique to this site are discussed. Funds for this public archaeology project were provided by a historic preservation grant from the Florida Division of Historic Resources.

* **11:20 am, ANS-10A** Prehistoric Site Distribution in the St. John's River Offset and Related Areas: A Spatial, Temporal, and Cultural View. VIRGIL R. BEASLEY, University of Central Florida, Orlando 32816. The St. John's River Offset of east-central Florida, long known for the abundant shell and sand mounds lining the banks of the river and related areas is examined using information from Moore, Wyman and Florida State File and maps generated showing all presently documented sites according to temporal distribution. The data are then examined to try to discern any cultural correlates relating to the dispersion of sites across the landscape.

Friday, 11:45 am
QUESTIONS

Friday, 2:45 pm - 4:25 pm, Room PH-237A
SESSION B - SYMPOSIUM - WHAT DOES SCIENCE SAY ABOUT HUMAN VARIATION?
Alvin W. Wolfe, University of South Florida, Presiding

2:45 pm, ANS-11B Scientists' View on Human Variation: Introduction to the Symposium. ALVIN W. WOLFE, Department of Anthropology, University of South Florida, Tampa 33620. Human scientists a century ago tended to confirm a European cultural belief that humans could be usefully categorized into basic types. Thus, they lent scientific legitimacy to a culturally particular classification, calling those types "races" and assigning them labels such as Caucasoid, Mongoloid, and Negroid. Although improved methods of physical/biological anthropology made it clear to scientists that human variation is much more complicated, those particular "races" had already been fixed in our cultural institutions, even in law and religion. Anthropologists have an obligation to explain that currently most useful concepts that are based on more evidence and more detailed analysis.

3:05 pm, ANS-12B The Distribution of Human Variation. LOREN MADRIGAL AND BARBARA WARE, Department of Anthropology, University of South Florida, Tampa 33620. The first Western-Scientific classification of humans into races was proposed by Carolus Linnaeus in 1758. Since then, scientists have been attempting to classify humans into such subgroups, producing a large number of classifications as well as of definitions of what exactly race is. This paper discusses the methodological difficulties associated with racial classifications, as well as the actual distribution of human variation. Specifically, it will discuss the relation between traits such as skin color and body size and shape (usually the basis for racial classification), and other human traits. It will be shown that races are not an accurate depiction of the distribution of human variation.

3:45 pm, ANS-14B Race and Racism: The American Association of Physical Anthropologists' Revision of the UNESCO Statement on Race. L.S. LIEBERMAN, Department of Anthropology, University of Florida, Gainesville 32611. The original United Nations charter included a statement on race and racism in 1945. There have been many subsequent revisions by international bodies covered by the United Nations Economic, Social and Cultural Organization (UNESCO). The latest revision was developed by the American Association of Physical Anthropologists in concert with other scientific organizations. This paper discusses the political process of this revision, the implications for science and social research, and the contents of the statement. The new statement includes the concepts of human biological diversity and the processes of microevolution that lead to this diversity. It avoids the typological construct of race and decries such concepts as pure races, miscegenation and racial superiority/inferiority.

4:05 pm, ANS-15B What is an Indian? SUSAN GREENBAUM, Department of Anthropology, University of South Florida, Tampa 33620. The aboriginal population of the New World was labeled "Indian" by the conquering Europeans. Although an obvious misnomer, this name was endured along with the equally ambiguous and misleading "Native Americans." The contemporary concept of the American Indian identity has considerable political significance in view of the special prerogatives of tribal sovereignty under the U.S. law. The legal definition of Indian is explicitly nonracial, and most recognized Indian tribes reflect admixture with Europeans and/or other groups. Nevertheless, conventional stereotypes of Indians are highly associated with phenotype, and many individuals who do not appear Indian have difficulty gaining acceptance as such. Conflicts over identity are especially problematic for individuals with African ancestry. This paper examines the multiple problems revealed in the lack of fit between legal definitions of Indian and the fold concepts about race and phenotype.

Friday, 4:25 pm
QUESTIONS AND DISCUSSION

Friday, 8:30 am - 11:25 pm, Room PH-209
SESSION C - GENDER AND WORK IN THE SUNBELT: ETHNOGRAPHIC PERSPECTIVE.
Kevin Yelvington, Presiding

8:30 am, ANS-16C Relationships Between Language Skill and Performance on an Entry-level Structured Job Interview. M. RAICH, Human Resources, Broward Sheriff's Office, P.O. Box 9507, Ft. Lauderdale 33310. The present investigation looks into the role language skill plays in effectiveness during a structured panel interview. Candidates for Deputy Sheriff Cadet in Broward County Florida were administered the Test of Adult Basic Education (TABE). Performance on the language scale of the TABE, of those who passed the exam, was related to performance across the dimensions assessed in the panel interview to examine the extent to which language skill was associated with each dimension and total score.

8:50 am, ANS-17C How the Initial Appeal of Challenging Work Can Be Increased or Decreased by Pay and Other Rewards. M. RAICH, Human Resources, Broward Sheriff's Office, P.O. Box 9507, Ft. Lauderdale 33310. Judgments of the initial appeal of challenging work, or intrinsic motivation for it has been found to be increased and decreased when pay and other rewards are provided. A view is discussed which suggests that any changes in initial attraction to a challenge is affected by the sense of

achievement and satisfaction experienced during its performance. The levels of these two factors is proposed to be determined by the amount of initial attraction to the work, interest in the rewards, what must be done to gain them, and individual differences related to achievement orientation.

9:25 am, ANS-18C Gender Impact on the Lives of Sunbelt Working Women. CHRISTEL M. VINSON, Project Independence, 3151 3rd Avenue N., St. Petersburg 33713. The impact of gender on the lives of Sunbelt working women is detailed with emphasis on the financial contributions of wives on the division of labor in the home and the options of inside versus outside labor. Child care responsibilities are also discussed. Then, examining cultural influences, the importance of support system networks will be identified detailing intricacies of network members and the variety of supports offered.

9:45 am, ANS-19C Gender and Compensation in the Research Institute. B.G. WARD, Center for Urban Transportation Research, College of Engineering, University of South Florida, Tampa 33620-5350. Academies of higher education traditionally have been viewed as the founts of wisdom and innovation: they may also serve as gatekeepers. This research explores how one unit within an institution of higher education carries out its mission and how these activities may reproduce these dual roles. The research findings may have implications that extend beyond the unit studied and the Academy. The charge of the unit is to influence public policy. The ways in which gender influences compensation suggests that gender also influences work assignments, promotion within the unit, and control of the work produced. How the practices of this unit may extend into the larger society and serve to reproduce gender disparities in public policy are discussed.

10:05 am, ANS-20C The Effects of Gender on the Noble Profession of Nursing. BRENDA JUNCO, University of South Florida, Department of Anthropology, Ph.D. Student, Tampa 33620-8100. The focus of this study is on gender and hierarchical relationships within a large hospital. A brief historical overview of the development of nursing within the United States is provided in order to identify the many ranks intrinsic to the profession. Problems of socialization within the profession of nursing are presented and compared to the data collected in this study. The concept of how nurses view their role is explored in order to determine if certain characteristics of gender are attributed to the role of nurse, and do these stereotypical characteristics effect the role of the nurse. The nurse-physician relationship is discussed as to the effects of gender on interaction perceptions and reality.

10:25 am, ANS-21C Elementary Science Education in Rural Hillsborough County, Florida. GUY HAGEN, Department of Anthropology, University of South Florida, Tampa 33620. Discusses research on how science is defined within elementary schools, and what affects access to it. The research was based upon two schools in southeast Hillsborough County: Plant City's Springhead Elementary, and the Glover School, a 1933 rural black elementary school. Research was based upon ethnographic observation, semi-structured interviews, and oral histories. Key informants were selected from the staff, administration, and students of these schools to represent a transition from 1947 to the present. Structural factors of social networks, race, class and gender are discussed as contributing significantly to elite education access in both schools.

10:45 am, ANS-22C Alienation of Athletic Females by Mass Media. WALTER LEE DOZIER, Department of Anthropology, University of South Florida, Tampa 33620. Media may be unknowingly impacting the health of millions of girls and women throughout the United States. Recent research has shown that girls participate in organized sports at one-third the level of boys. Further, a recent study by the

Center for Disease Control and Prevention in Atlanta show that only 25 percent of female high school seniors exercise vigorously on a regular basis compared with 50 percent of boys the same age. Media may be partially responsible for this trend by creating unfavorable images of women involved in sporting activity or by simply ignoring images of females involved in sports or exercise. Efforts to change these kinds of presentations are being met resistance in some male-dominated work environments that are unsupportive and at times hostile to women and enlightened males.

11:05 am, ANS-23C Letting Your Hair Down: Work and Gender Relations at a Hair Salon. SHARON HODGES, Department of Anthropology, FMHI, MHC-238, University of South Florida, Tampa 33612. Ethnographic field methods were used to gain an understanding of how gender is constructed in a hair salon. Defining culture as something that is learned and shared, this research emphasized the kinds of things people need to know to do what they do. What is the nature of the stylist client relationship? What are the rules that govern appropriate behavior for men and women at the salon? What norms exist for professional conduct? What is the division of labor at the salon? Direct observation, key informant interviews, and an ethnosemantic exercise were employed as the primary methodologies in this research. Male-female, male-male, and female-female contact among coworkers as well as between stylists and their clients made this a rich atmosphere to observe the construction of masculinity and femininity in relation to one another.

Friday, 11:45 am
SECTION MEETING: ANTHROPOLOGICAL SCIENCES
Robert J. Austin, Janus Research, Presiding

Friday, 8:45 am - 11:45 am, Room PH-215
SESSION A - ESTUARINE ECOLOGY/WATER QUALITY
Dr. Clay Montague, Department of Environmental Engineering, University of Florida, Presiding

* **8:45 am, BIO-1A** Determination of the Attenuation of Photosynthetically Active Radiation by Epiphytic Growth on Seagrasses. L.K. DIXON AND A. NISSANKA, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota 34236. In the investigation of the light requirements of seagrasses, a technique was developed to measure the attenuation of photosynthetically active radiation by epiphytic growth on both *Thalassia* and *Helodule*. Seagrass shoots were scraped of epiphytic cover, maintaining epiphyte structure as much as possible. The attenuation of a standard light source by the epiphytic suspension was measured in a transparent dish relative to the attenuation of a blank solution. The attenuation so determined was corrected for the difference between seagrass blade area scraped and dish area. The corrected attenuation attributable to epiphytes represents an integrated value of the shoot's epiphytic load evenly distributed over the entire area of the blade scraped. Periodic determinations of epiphytic attenuation were coupled with long term measures of water column attenuation to develop light requirements of seagrasses in both Sarasota and Tampa Bays. Efficacy of the technique is demonstrated by the convergence of annual light regimes when epiphyte attenuation is included.

* **9:00 am, BIO-2A** Evaluation of the Fluorometric Whole-Water Technique for Quantifying Chlorophyll in Tampa Bay Waters. J.O.R. JOHANSSON, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. Chlorophyll is an important indicator of estuarine water quality and has been selected as a tool to manage external nitrogen loads to Tampa Bay. Organizations charged with Tampa Bay water quality monitoring generally use the spectrophotometric method for chlorophyll measurements. This is a cumbersome technique susceptible to serious errors. The current availability of moderately priced, highly sensitive, fluorometers has allowed for the development of the whole-water chlorophyll- technique. This procedure provides for rapid and uncomplicated chlorophyll analysis by eliminating the steps of, and pitfalls associated with, filtration and homogenization. The whole-water technique being evaluated by the City of Tampa Bay Study Group utilizes a small amount of sample water (0.7ml) mixed with 6.3ml of 100% acetone. Following extraction, chlorophyll is measured in a filter fluorometer, optically configured to provide sensitive determination of chlorophyll without the need for acidification. About 250 bay samples have been analyzed since January 1995 using both the whole-water and the spectrophotometric techniques. Results from this comparison will be presented.

* **9:15 am, BIO-3A** Nutrient Bioassay on Natural Phytoplankton Populations in Tampa Bay. BRIDGET O. KELLY, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. The City of Tampa Bay Study Group began a monthly sampling program in June 1993, to determine what, if any, the limiting nutrients for phytoplankton in the four sections of Tampa Bay are. Water samples were collected from four stations quarterly, and from one station monthly. Subsamples were treated with a nitrogen addition, a phosphorous addition, a nitrogen + phosphorous addition, or no nutrient addition (control). The response of the phytoplankton to changes in nutrient additions was indicated through changes in algal biomass, measured as chlorophyll- . Initial results have indicated that all sections of the bay are either primarily or exclusively nitrogen limited at all times of the year.

* **9:30 am, BIO-4A** The Distribution and Abundance of the Tunicate *Bostiobranchus digonas* and its Relationship to Water Quality in Tampa Bay, Florida. E.V. PINSON AND J.O.R. JOHANSSON, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. Historical information and background data from three stations covering sediment types from mud to sand will preface updated distributional information on the solitary tunicate *Bostriobranchus digonas* in the Tampa Bay system. Trawls were taken during January and February 1995 and a distributional map was generated for *B. digonas* in the Tampa Bay system. As a result of the high filtration rates common in solitary ascidians, coupled with high tunicate densities, water quality has dramatically improved over the 1994-1995 winter months. Chlorophyll- concentrations as low as 0.8 ug/l have been reported and Secchi depths as great as 8.7 meters have been observed in the water column over these communities.

* **9:45 am, BIO-5A** Interaction of Herbicides with the Rotifer, *Brachionus plicatilis*. BRUCE C. WINKLER, PATRICK INGLE, AND MARCIO VALENZUELA, Department of Chemistry and Physics, University of Tampa, Tampa 33606. The effects of three commercially available herbicides containing glyphosate, atrazine or trichlopyr on three strains of the salt water rotifer *Brachionus plicatilis* will be discussed. The three strains known as the Russian, Hawaiian, and Austrian were grown in sterile F/2 artificial sea water medium containing *Cylindrotheca* sp. N_1 (Bacillariophyta) as the food source. The rotifers were grown at room temperature under continuous fluorescent lighting (intensity = 150 iM $m^{-2}s^{-1}$) and air bubbling. Rotifers were removed during log phase growth and the LC_{50} values determined).

* **10:00 am, BIO-6A** Recolonization by *Halodule wrightii* in Hillsborough Bay, Florida. W.M. AVERY, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. The status of *Haoldule wrightii* in Hillsborough Bay has been monitored since 1986 with data on areal coverage, short shoot density, blade length, and epiphytes recorded seasonally. Today, *H. wrightii* has recolonized about two percent of the subtidal flats in Hillsborough Bay. About 1000ha of the subtidal area less than two meters in depth may be suitable for future seagrass expansion. The potential effect of water quality on seagrass distribution will be discussed.

* **10:15 am, BIO-7A** Does Salt Marsh Impoundment Management Affect Nesting Wading Bird Dispersal? C.E. SEWELL, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. Four management techniques were used in 37 mosquito control impoundments adjoining the Indian River Lagoon in St. Lucie County, Florida during the summer season. One technique, the drawdown, provided for mosquito control but also enhanced foraging opportunities for wading birds by periodically lowering water levels and concentrating prey. Three established colonial wading bird nesting sites near the impounded wetlands were surveyed during the breeding season to determine if management techniques affected dispersal from the colonies. Flight direction surveys were conducted at the colonies on the ground while aerial data were collected of the distribution of foraging wading bird flocks in the impoundments in relation to management practices. The effect of the drawdown technique in managed impoundments on wading bird dispersal from the colonies is discussed.

10:30 am, BREAK

* **10:45 am, BIO-8A** Characterization of Manatee Habitat in the Vicinity of Sarasota Bay, Florida. JAY F. GORZELANY AND JESSICA K. KOELSCH, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota 34236. The Sarasota area recently has been recognized as an important area for manatees during non-wintering periods. Relatively high-use areas, along with control areas, were visited

in 1993 and 1994 in order to collect physical, chemical, biological, and geographical data in order to assess characteristics which may serve as either attractants or deterrents to manatees. Results indicate that key in habitat determinants for manatees in the Sarasota area are related to the level of human impact and degree of physical shelter or refuge. Lower priority determinants were related to seagrass composition and abundance, water quality, and submerged bottom characteristics.

* **11:00 am, BIO-9A** The Seasonal (Re)use of the Sarasota Bay Area by Manatees. JESSICA K. KOELSCH, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota 34236 and University of South Florida, Tampa 33620. Mote Marine Laboratory has been conducting manatee photographic identification studies in the Sarasota Bay area during non-winter months (April-October) since April 1993. We are utilizing distinctive natural and human induced marks to recognize individual manatees. We have cataloged 63 "Distinct Known" manatees to date. Of these, 46 (73%) have been resighted at least once seasonally or annually in the study area and 23 (37%) have been observed during both years of the study. One adult and one subadult have been sighted 45 and 63 times, respectively. Analyses of pilot study data have matched cataloged individuals to ones seen in 1989 and 1991. Numerous resightings throughout each season suggest there may be seasonal residents; few resightings of others indicate there may also be transients or individuals using a region larger than our primary survey sites. Preliminary data suggest many of the same individuals return to Sarasota during the non-winter months annually; expanded, long-term studies may provide additional support to these theories.

* **11:15 am, BIO-10A** Threats to Biodiversity in Florida Estuarine Systems: Case Study of the Indian River Lagoon (East Central Florida). A.J. ZAHORCAK AND H.M. SWAIN, PH.D., Florida Institute of Technology, Department of Biological Sciences, 150 W. University Blvd., Melbourne 32901. The Indian River Lagoon is recognized widely as an estuary of high biological diversity. In 1994 a conference on the "Biodiversity of the Indian River Lagoon" was held to address the status of biodiversity in the lagoon. This paper will synthesize the findings of this conference including a characterization of communities and species in the Indian River Lagoon, as well as the threats to this biodiversity in particular, habitat and ecosystem fragmentation, introduced species, pollution and water quality, and overexploitation. Seagrasses in the lagoon have been studied extensively as indicators of water quality and the health of the lagoon, yet there are other lesser known groups that can also act as indicators of lagoon viability, i.e., amphipod, ectoproct, and theophilic communities. Human impacts on manatees and sea turtles are well known, but other species are affected as well, for example, river otters, wading birds, fisheries, opisthobranchs, etc. The relationship between uplands, estuarine waters, ocean and offshore systems and inlets was examined in several ways, i.e., the consequences of the disruption of salinity and tidal regimes, hydrological and fire processes and nutrient transport mechanisms, as well as the possible breakdown of the geological processes within the lagoon. The lagoon's unique habitat composition and the large amount of information currently known about it make it a good system on which to base a case study for threats to biodiversity in estuarine systems.

11:30 am, BIO-11A Predation by Birds and Fishes on Tree Crabs in a Costa Rican Mangrove Estuary. KLAHRE, L.E., L.M. DIAZ, AND W.A. SZELISTOWSKI, Department of Marine Science, Eckerd College, St. Petersburg 33711. Predation on the mangrove tree crab *Aratus pisonii* by the great-tailed grackle *Quiscalus mexicanus,* the snappers *Lutjanus* spp., and the catfish *Ariopsis seemanni* was studied in the Gulf of Nicoya, Costa Rica. Behavioral observations indicated that grackles enter mangroves to forage on tree crabs, and gut content analyses suggested that snappers and catfishes commonly take tree crabs as prey. Observations showed that although crabs infrequently descend to the water's surface

without provocation, they readily jump into the water to escape predation by birds. A field experiment suggested that noises produced by birds pursuing crabs attract fishes to sites of crab prey availability. The foraging activities of the great-tailed grackle may enhance the feeding success of snappers and catfish.

Friday, 11:45 am
SECTION MEETING: BIOLOGICAL SCIENCES
Linda Mytinger-Tyson, University of Florida, Presiding

Friday, 2:45 pm - 5:30 pm, Room PH-215
SESSION B - WETLAND ECOLOGY AND RESTORATION
Dr. Ted Rochow, Southwest Florida Water Management District, Presiding

* **2:45 pm, BIO-12B** Environmental Efficiency Evaluation of the Contaminated Non-Process Wastewater Treatment System. MICHAEL S. BATTS, The Phoenix Environmental Group, Inc., Tallahassee 32301. Occidental Chemical Corporation (OxyChem), in White Springs, Florida, researched and developed an innovative, non-conventional wastewater treatment system that uses waste clay as an adsorption medium for nutrient removal. Nutrients (primarily ammoniacal nitrogen (as N), total nitrogen (as N) and total phosphorus (as P) are removed with a high level of efficiency at minimal costs. A pilot system predicted an 85-95% removal efficiency of the nutrients. Based on these results, OxyChem developed a full scale application of the treatment system using a 1200± acre clay settling area to mix contaminated non-process wastewater (CNPW) and clay slurry in order to achieve nutrient removal. The CNPW is also afforded additional treatment from wetland vegetation present (bioassimilation) and volatilization. The post treatment system monitoring results have been excellent. Removal efficiencies have been in the ranges predicted from the pilot system. This non-conventional wastewater treatment system provides a high level of nutrient removal with minimal economic input for the phosphate industry.

* **3:00 pm, BIO-13B** Long-term community parameters for 10 forested wetlands in central Florida. P.M. DOORIS (1,2) AND G.M. DOORIS (1), (1) Saint Leo College, Saint Leo 33574, (2) Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. Quantitative data on plant species have been collected on a quarterly and/or semi-annual basis on ten forested wetlands since 1988. Parameters (species diversity, species richness, relative frequency, relative dominance) have been calculated and compared between and within the study sites for herbaceous species, shrubs, and trees. Parameters were related to the water levels and hydroperiods in the sites and to a "Wetland Affinity Index" (WAI) derived for this study. Considerable variability both between and within sites was seen. Hydroperiods influence species diversity, species richness, and the WAI.

3:15 pm, BIO-14B The Use of Garlon for Controlling the Exotic *Melaleuca quinquenervia* in Coastal Wetlands. K.C. PASSARELLA AND M.J. BARRY, Kevin L. Erwin Consulting Ecologist, Inc., 2077 Bayside Parkway, Fort Myers 33901. Different rates (0 to 20 percent) of the herbicide Garlon 3A were applied to cut stumps of the exotic *Melaleuca quinquenervia* within 31 wetland study plots on Little Pine Island, a barrier island off the coast of Lee County in southwest Florida. The 20 percent application rate for Garlon 3A was the most effective with no resprouts or new growth at the end of the nine month study period. For lessor application rates, resprouting occurred from the roots of larger stumps (trees > 4 inch DBH) and from the stems of the smaller stumps (trees < 4 inch DBH).

3:30 pm, BIO-15B Herbaceous Wetland Creation Using the Mulching Technique. C.M.

SMITH AND J.M. IHNAT, Kevin L. Erwin Consulting Ecologist, Inc., 2077 Bayside Parkway, Fort Myers 33901. Mulching is examined as a successful technique in several created herbaceous wetlands in central and south Florida. The effectiveness of the use of wetland mulch for rapid establishment of desirable wetland species such as fireflag, maidencane, pickerelweed, spikerush, smartweed and arrowhead is illustrated in several wetland creation projects. Wetland ground cover persisted at over 70 percent in one marsh created via mulching despite significant fluctuations in water level. At another site, areal percent cover of wetland plant species reached 60% in a mulched wetland as compared to 40-50% for two planted marshes within three months of construction. At a third wetland creation site, areal percent cover, species diversity and species richness remained greater in a mulched wetland compared to two planted marshes of similar design 1.5 years after construction. Potential consequences of extended mulch stockpile are also reviewed.

* **3:45 pm, BIO-16B** Use of Emergent Plant Stems for Oviposition by the Florida Applesnail: Implications for Marsh Management. R.L. TURNER, Department of Biological Sciences, Florida Institute of Technology, Melbourne 32901. Females of the large, broad-footed *Pomacea paludosa* crawl out of water on plant stems and lay clutches of eggs that adhere to the stems during embryogenesis. This study in a marsh west of Vero Beach examined: the distribution of clutches among and within plant associations; characteristics of plans that make them suitable for deposition and retention of clutches. Clutch density was highest along the edge of sawgrass stands and zero in deep marsh; density in maintenance and mixed shallow marsh was one-third that in sawgrass. In all plant associations except sawgrass, clutches were disproportionately laid on broad-stemmed plants rather than on narrow-stemmed plants. Plants most used for oviposition were *Cladium jamaicense, Crinum americanum, Pontederia cordata,* and *Sagittaria lancifolia,* and they held the clutches higher off the water. Marshes should be managed to provide a heterogeneous community of emergent plants with moderate density of broad-stemmed species. Funding by contract 91D192 from St. Johns River Water Management District.

4:00 pm, BIO-17B Qualitative Sampling of Aquatic Macroinvertebrate Communities in Created and Restored Wetlands. D.W. CEILLEY AND W.R. COX, Kevin L. Erwin Consulting Ecologist, Inc., 2077 Bayside Parkway, Ft. Myers 33901. Aquatic macroinvertebrate community assemblages are examined in created and restored wetlands of south Florida. Qualitative sampling techniques are examined for the monitoring of biological integrity in mitigation wetlands required by agency permits. Species, species richness, and relative abundance data are compared for wet season monitoring events in five wetland creation project sites in Brevard, Collier and Lee Counties. Sampling techniques, cost effectiveness and sampler bias are also discussed.

* **4:15 pm, BIO-18B** Differences in Species Composition and Abundance of Anurans in Natural and Created Wetlands in a Native Landscape in S.W. Florida. M.J. BARRY (1) AND R.L. VANFLEET (2), (1) Kevin L. Erwin Consulting Ecologist, Inc., 2077 Bayside Parkway, Fort Myers 33901, (2) Sarasota County Government, Natural Resources Department, 1301 Cattlemen Road, Building B, Sarasota 34232. Frog surveys were conducted in 19 sites, including ten natural wetlands, four created wetlands and five borrow pits littoral zones, at weekly to monthly intervals for one year. The number of each species calling was estimated and placed into one of seven abundance categories for analysis. Temperature, rainfall, and hydrolic data were collected, and wetlands were evaluated in terms of plant species composition, dominance, and vegetative structure. Comparisons between wetland types confirmed the importance of hydrology and vegetative structure in anuran species breeding site selection. Comparisons within wetlands over time documented local seasonality of chorusing behavior as related to temperature and rainfall.

* **4:30 pm, BIO-19B** Fish Community Assemblages in Central and South Florida Created and Restored Wetlands. W.R. COX AND D.W. CEILLEY, Kevin L. Erwin Consulting Ecologist, Inc., 2077 Bayside Parkway, Fort Myers 33901. Fish community assemblages are examined in created and restored wetlands in central and south Florida. The effectiveness of several different sampling techniques used for permit related wetland monitoring is discussed. Species, species richness and relative abundance data are compared for wet season monitoring events for five wetland project sites in Lee, Collier and Brevard Counties. Fish data is compared between wetland types and within wetland types over time from two to six years.

4:45 pm, BIO-20B Female Mate Copy Choice in Mosquitofish (*Gambusia affinis holbrooki*). B.J. ENGLISH AND STEPHEN A. TAYLOR, Department of Psychology, Armstrong State College, 11935 Abercorn St., Savannah, GA 31419-1997. In general, female mosquitofish show a strong preference for mating with plain over melanistic males. Two experiments were conducted. The first demonstrated that female mosquitofish show a greater preference for plain males viewed interacting with other females (i.e., exhibit mate copy choice). The second experiment demonstrated that female preference for plain males could be reduced after the female was allowed to view melanistic males interacting with other females. The condition of interaction paired with preference was sufficient to produce a decrease in female preference for plain males in some measures.

5:00 pm, BIO-21B An Inquiry into the Avian Utilization of a Small Lake in West Central Florida. GLENN P. LADWIG, Department of Science and Mathematics, Saint Leo College, Saint Leo 33574. Through repetitive sampling over a six-month period (Sept.'94-Feb.'95), quantitative and qualitative data have been collected regarding the lake-dependent avian population of Pasco County's Clear Lake. Research parameters include species diversity, habitats occupied, number of individuals, activity performed, and seasonality. Results have been compared to a non-specific study of Clear Lake performed by SWFWMD (June'92-Feb.'93). A significant variance in species diversity was observed. Individual explanations for these species variants have been hypothesized.

* **5:15 pm, BIO-22B** Trends in Wetland Health in the Northern Tampa Bay Area and Options for Managing Water-Related Impacts. T.F. ROCHOW AND LOU KAVOURAS, Southwest Florida Water Management District, 2379 Broad St., Brooksville 34609. For many years an extensive program of wetland monitoring has existed in the northern Tampa Bay area. Overall, the results show a regional decline in wetland health caused by both wetland drying in areas of extensive ground-water withdrawal and by a variety of influences in areas of agricultural and urban development. The literature and scientific findings on wetland health in the region are discussed. Possibilities for mitigating wetland impacts due to abnormal dryness include local ground-water augmentation, rehydration of wetlands and the Floridan aquifer with stormwater or reclaimed water, and management of ground-water withdrawal on a regional basis.

* **5:30 pm, BIO-23B** Ecological Considerations in Determination of Water Needs in the Suwannee River Drainage. ROBERT A. MATTSON, Suwannee River Water Management District, Rt. 3, Box 64, Live Oak 32060. The Suwannee River drainage (25,770 km^2) is the second largest river system in Florida. Mean flow is 298.5 m^3/sec and the 50% exceedence flow is 238 m^3/sec. The river is heavily influenced by groundwater input from the Floridan Aquifer downgradient of a feature known as the Cody Scarp. The river exhibits five distinct reaches, plus the estuarine portion of the system. Ecological communities in each region have specific water needs and instream flow requirements. In upper reaches of the drainage, river channel habitat considerations appear to be important in setting instream flow requirements, e.g., protection of benthic communities in shallow riffle areas. In lower reaches, floodplain

and riparian areas and their water needs appear to be more important; e.g., maintaining appropriate hydroperiods in floodplain swamps. The estuary is dominated by freshwater input from the river, suggesting that any reductions in freshwater inflow would be expected to alter its ecological characteristics. Better quantifying linkages between ground water input and stream flow is an important need for protection of the river/estuary ecosystem. Monitoring and studies are ongoing or will be initiated to better understand hydro-biological relationships in both riverine and estuarine communities in the drainage.

Friday, 2:45 pm - 5:00 pm, Room PH-217
SESSION C - MARINE ECOLOGY
Dr. Sheila Brack-Hanes, Eckerd College, Presiding

2:45 pm, BIO-24C Diversity of Energetic Strategies among Echinoid Larvae and the Transition from Feeding to Nonfeeding Development. J.C. HERRERA, Department of Zoology, University of Florida, Gainesville 32611. My current work investigates a major ecological transition in echinoderm life cycles: the evolution from planktotropic to lecithotrophic larval development. I have discovered a wide range of feeding requirements among subtropical echinoid larvae. Differences in maternal investment determine how much external food is required to build the larval body and subsequently the juvenile rudiment. There appears to be a continuum of nutritional strategies between extreme obligate planktotrophy and functional lecithotrophy (i.e., facultative plantotrophy). I suggest that the ecological boundary between planktotrophy and lecithotrophy is easily crossed and that unlike morphological changes, ecological transitions are readily reversible. This work was supported by grants from Sigma Xi and the Lerner-Gray Fund for Marine Research (AMNH), by a National Defense Science and Engineering Graduate Student Fellowship (ONR) and funding from the Florida Institute of Oceanography; and by NSF grant OCE-9115549 to L.R. McEdward.

3:00 pm, BIO-25C Population Density of Sea Urchins (*Lytechinus variegatus*) in Relation to Standing Crop of Seagrasses in Biscayne Bay. J.R. MONTAGUE, A. MORALES AND I. GONZALEZ, SHNS, Barry University, Miami Shores 33161. From May 1994 through February 1995 we collected sea urchins and benthic vegetation from two sites near Key Biscayne (Bear Cut Channel and Crandon Park) and one site near Virginia Kay (MAST Academy). The MAST urchin densities fluctuated considerably (from roughly 3 urchins/m^2 in summer '94 down to 0 urchins/m^2 in October '94; in February '95 the site was back up to roughly 0.3 urchins/m^2). Urchin densities at the Key Biscayne sites showed much less variability over the same time period. Turtle grass (*Thalassia testudium*), the main food for *L. variegatus*, ranged in mean biomass from roughly 40-50 g dry wgt./m^2 at Bear Cut, to roughly 10-20 g dry wgt./m^2 at MAST Academy, to roughly 5 g dry wgt./m^2 at Crandon Park. These data add to our seven-year database on the seagrass ecology near Key Biscayne. (Supported by NIGMS-MARC).

3:15 pm, BIO-26C Reconstructing the Evolution of Development and Dispersal among Starfishes. DANIEL JANIES, University of Florida, Department of Zoology, Gainesville 32611. Almost all starfish that have been studied undergo larval development of pelagic (free-living and dispersive) young. Development via a larva is termed indirect development because it includes specialized non-adult morphologies and requires metamorphosis to achieve the body plan of the juvenile and adult. Direct development is a rare phenomenon that has evolved in a small subset of the starfish species that brood-protect their young and do not allow them to disperse. In direct development the adult body plan forms from the embryo without passing through a larval stage or metamorphosis. I studied the developmental diversity of starfishes and used comparative methods to test hypotheses such as: 1) Do ecological changes in life cycles require changes in development? 2) Are evolutionary shifts from pelagic development to brooding

irreversible? Contrary to traditional concepts, most brooding lineages do not evolve direct development and the young of these species do not lose larval structures or functions. Developmental stasis likely allows some lineages to switch freely between pelagic and brooded development. Larval development may be maintained in dynamic environments that require a variety of life cycle strategies over time. Lineages that lose dispersive larvae are subject to extinction when the local conditions deteriorate. The evolution of brooding leads to direct development only in rare instances of extreme brood protection in which embryos are released from selection for larval structure and function for long periods of time.

3:30 pm, BIO-27C Brood Release, Post-marsupial Growth and Molting, and the Development of Secondary Sexual Characteristics of *Bowmaniella brasiliensis* (Crustacea: Mysidacea). D. DRAKE AND W. PRICE, University of Tampa, Tampa 33606. Brood release, post-marsupial growth and molting, and development of secondary sexual characteristics of the estuarine mysid *Bowmaniella brasiliensis* were investigated in the laboratory. Ovigerous females released young at night between 2330 and 0130 hours. After liberation, the juveniles sank to the bottom and molted within several minutes, allowing them to swim freely. At 21±0.5°C and 24±0.5 ppt, both males and females had mean daily growth rates of 0.23 mm/day. Growth rates were linear for the first 30-35 days and then decreased considerably after the mysids reached maturity. Females grew larger (mean of 11.2 mm) and molted 1 more time on average than males (mean of 10.2mm). A significant negative correlation existed between the log of the growth factor (the percentage increase in size occurring between successive molts) and body length for both sexes. A significant positive correlation existed between the log of the intermolt period and body length for both sexes. The appearance of secondary sexual characteristics was documented. The development of the marsupium in the females required 4 molts. The third pleopod of males, which is thought to serve as a copulatory organ, developed in 5 molts.

3:45 pm, BREAK

4:00 pm, BIO-28C Distribution of Neustonic Myctophidae in Northern and Southern Sargasso Seas. J.N. LINDLEY, Department of Marine Sciences, Eckerd College, St. Petersburg 33711. Sea Education Association of Woods Hole, MA has done extensive sampling of the Northern and Southern Sargasso Seas. Thanks to their archiving of samples, an in-depth study of the distribution of six prevalent neustonic species of the family Myctophidae was conducted. Both interspecific and intraspecific spacial relationships were examined along with trends associated with changes in latitude.

4:15 pm, BIO-29C Spine Replacement in a Freshwater Population of the Atlantic Stingray, *Dasyatis sabina*. ELENA AMESBURY AND F.F. SNELSON, JR., Department of Biology, University of Central Florida, Orlando 32816. *Dasyatis sabina* is distributed in coastal habitats from Chesapeake Bay to Campeche, Mexico. It is broadly euryhaline and individuals often stray into fresh water. The only well-known population to reside permanently in fresh water occurs in the St. Johns River, Florida. We studied the pattern of caudal spine replacement in this population to see if it differed from previous reports for a marine population. Monthly samples totaling 181 adults were taken from Lake Monroe near Sanford from November 1990 to May 1992. Spine replacement began in May with the appearance of a primordial bud. A calcified replacement spine was present in 45 percent of June specimens and in 95 percent of July and August specimens. Replacement spines were present in only 20 percent of specimens taken in September and October, indicating that replacement was completed in most individuals by late summer or fall. Replacement spines grew rapidly from an average length of 6 mm in June to 28 mm in August. The primary spine exfoliated when the replacement spine reached about 50-60 percent of its definitive length. The replacement spine reached its definitive length, averaging 60-65 mm, by the early winter. Definitive

spine length was strongly correlated with body size. In all cases the replacement spine originated posterior to the primary spine. Spine replacement and growth patterns in this population are similar to those in the population from the eastern Gulf of Mexico.

4:30 pm, BIO-30C Phagocytic and Pinocytic Activities of Shark and Skate Immune Cells. CATHY WALSH, PATRICIA BLUM, AND CARL LUER, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota 34236. Cells isolated from lymphomyeloid tissues (spleen, epigonal, and Leydig organ from the clearnose skate, *Raja eglanteria,* and spleen and epigonal from the nurse shark, *Ginglymostoma cirratum)* and peripheral blood (PBL) from both species were assayed for phagocytic and pinocytic activities *in vitro.* During 24 hours of culture (0, 1, 2, 3, and 24 h), phagocytosis was evaluated numerically through ingestion of Congo red stained yeast, and pinocytosis was assessed spectrophometrically through uptake of neutral red. Both activities were essentially maximal by 2 h of culture. Phagocytosis and pinocytosis were highest in cells isolated from Leydig and epigonal organs. Thirty-five percent of shark epigonal cells, 50% of skate epigonal cells, and 75% of skate Leydig cells were phagocytic. Epigonal and Leydig cells typically ingested more than five yeast per cell whereas splenocytes and PBL generally ingested only one yeast per cell. These activities suggest significant immune functional roles for Leydig and epigonal organs among elasmobranch fish.

4:45 pm, BIO-31C A Phylogenetic Study of Species within the Three Subfamilies of Hydrocharitaceae using Chloroplast rbcL Gene Sequences. J. GERMANO AND S.D. BRACK-HANES, Eckerd College, St. Petersburg 33733. The ancestry and path of evolution for marine species of this family are not clearly understood. Therefore, an analysis of sequences within the conservative gene that codes for the subunit of ribulose 1,5-biphosphate carboxylase, an enzyme necessary for photosynthesis, would be useful to help clarify some questions concerning seagrass evolution.

5:00 pm, BIO-32C Effect of Structures on the Recruitment of Meiofauna in Coral Reef Sediment. R.E. ROY AND R.J. RUNNELS, University of Tampa, Tampa 33606. Sessile organisms and other structures on coral reefs likely create a heterogeneous flow regime near the bottom. Knowledge of these effects would help us understand the patchiness of motile organisms on coral reefs. We studied the effect of standardized hemispherical coral mimics on the recruitment of meiofauna into adjacent sediment trays. Six replicates of experimental treatments, plus control trays, were set up over two one-day periods. Trays placed in the high-flow areas beside the coral mimics yielded significantly higher numbers of copepods than those in the low-flow areas. Possible explanations include differences in the supply of recruits and hydrodynamic effects on settling behavior.

Friday, 2:45 pm - 5:00 pm, Room PH-213
SESSION D - BOTANY/ENTOMOLOGY

Dr. Doug Oliver, Florida Department of Environmental Protection, Presiding

2:45 pm, BIO-33D Apparent Brush/Spire Needle Development on Natural Hybrids of *Pinus* Species. RONALD F. MENTE, Ronald F. Mente, Consultant, 939 45th Street No., St. Petersburg 33713. Needles of *Pinus taeda L.* arise in brushes; whereas other naturally occurring pine species in Florida have needles that arise in spires. Apparent natural hybrids of *P. taeda L.* with *P. elliottii* Engelm., *P. densa* (Long & Lak.) DeLaub. & Silba, *P. pinellasensis* Beckner ex. Mente, *P. dolichophyllus* Mente and *P. palustris* Miller, which is per definition *P. xsonderegger*i (Chapman) Mente, have been observed in the field. Apparent primary hybrids of *P. taeda* L. and these species (F_1) yield needles that arise in brushes. The brush allele is dominant in the F_1 generation. The F_2 generation of F_1 crossed with a spired species yields

spires; crossed with *P. taeda* L. it will yield brushes, two F_1's with brushes cross yield brushes and if one has spires and the other one brushes, it will yield brushes.

3:00 pm, BIO-34D Report of Rapid Variations in Needle/Fascicle Numbers on *Pinus* Species in Pinellas County. RONALD F. MENTE, Ronald F. Mente, Consultant, 939 45th Street No., St. Petersburg 33713. While monitoring *Pinus* species in Pinellas County over the last six years, unusual needle/fascicle (N/F) numbers have been collected. While examining branch tips of a *Pinus garrelsensis* Mente (N/F: 1's-5's) that was 2 1/4 miles downwind from a known source of continuous radioactive emissions, it showed no significant variation of N/F on 18 branch tips. However, on a *Pinus xpalphyllus P* the N/F shifted to statistically significant N/F of 4's over a three week time period, growth measured at 1.0 cm/week, early in 1993. This change from determinant to indeterminant growth, coupled with others lead this writer to believe that this was the result of, at least in part, low level natural radiation.

3:15 pm, BIO-35D A Comparison of Pollen Morphology between *Malvastrum corcholifolium* and other species within the Malvaceae. J. GERMANO, D. PITAMBER, L. VERY AND D. WADLE, Eckerd College, St. Petersburg 33733. A comparison is made between the mature pollen of *Malvastrum corcholifolium, Gaya gracilipes* and *Modiolastrum gilliesii*. These plants represent three members of the Abutileae tribe, one of the five tribes that make up the malvacean family. All species are spherical, tectate and colporate, displaying similar patterns of pores. *Modiolastrum gilliesii* is 3-6 colporate, *G. gracilipes* is 9-12 colporate and *M. corcholifolium* is 12-15 colporate. Differences also exist in spine density. These comparative studies will help to clarify malvacean taxonomic classification and phylogeny.

3:30 pm, BIO-36D Compartmentalization of Biomass in Five Species of Ferns in West Central Florida. I. BARTSCH AND J.M. LAWRENCE, University of South Florida, Tampa 33620. Biomass production and partitioning were determined for distinct, monospecific populations of *Woodwardia virginica, Thelypteris dentata, Pteridium aquilinum, Polypodium polypoides,* and *Osmunda regalis* in West-central Florida. Aboveground biomass was greatest for *O. regalis* (48.3 g/m2) followed by *W. virginica*. *T. dentata* produced the least aboveground biomass. In leaf, of all species, *W. virginica* had more biomass in leaflets than in stems. *T. dentata* allocated significantly more energy to producing long rather than heavy leaves than the other 4 species, based on ratios of length to biomass. All species examined appear to allocate biomass in order to maximize the acquisition of light.

3:45 pm, BIO-37D André Michaux in Florida. W.K. TAYLOR (1) AND E.M. NORMAN (2), (1) Department of Biology, University of Central Florida, Orlando 32816, (2) Department of Biology, Stetson University, DeLand 32720. André Michaux (1746-1802) spent 11 years exploring much of present-day United States east of the Mississippi River, in eastern Canada, the Bahamas, and in East Spanish Florida. Michaux was the official botanist of King Louis XVI. From 28 February to 25 May 1788 André Michaux visited East Spanish Florida, which was under the governorship of Manual Zespede, first Governor of the Second Spanish Period. The Michaux party explored the Florida East Coast south of St. Augustine to Cape Canaveral, and then ascended the St. Johns River. We are retracing the routes taken by the Michaux party as well as documenting the plants that he found while in Florida. Preliminary results from our study will be presented. A grant from the Michaux Fund of the American Philosophical Society in Philadelphia has aided us in our research.

4:00 pm, BIO-38D The Genetics of Timing the Insect Life Cycle in Seasonal Environments. DR. STEPHEN KUCERA, University of Tampa, Tampa 33606. Insects must time their life cycles properly in order to grow and reproduce during favorable periods and avoid unfavorable periods (winter, drought, etc.) that are seasonal in nature. Many insects enter diapause, a type of dormancy, before the onset of

unfavorable conditions and terminate diapause when favorable conditions return. A second trait, development time (the time required to develop from egg to adult), mitigates the appropriateness of the decision whether to diapause. I will discuss the responses of these traits to divergent selection and the correlated responses to selection in the Indian Meal Moth (Pyrallidae: *Plodia interpunctella*) and the role of the genetic correlation of these traits to the evolution of the timing of the life cycle.

4:15 pm, BIO-39D Preliminary Survey of Insects in Spear's Scrub, Rock Springs Run State Reserve, Orange County. J.C. LONGHURST AND S.M. SULLERTON, University of Central Florida, Orlando 32816. Preliminary results of a study to catalog the insects of Spear's Scrub are discussed. Emphasis is placed on collection techniques currently used plus future plans. This will be an ongoing study with the ultimate goal of studying the effects of prescribed burning on insect communities.

* **4:30 pm, BIO-40D** Surface Modification of Surfaces: Impact on Removal of Heavy Metal Toxicity. ERIC JUO AND GABRIEL BITTON, Department of Environmental Engineering Sciences, University of Florida, Gainesville 32611. Heavy metals are persistent toxicants which must be removed by water and wastewater treatment processes. Several approaches are available for removing toxic metals and include complexation, precipitation, and adsorption to biological and mineral surfaces. Magnetic separation is one of the proposed approaches for heavy metal removal and consists of adsorbing the metals to magnetite particles followed by separation with a magnet. Magnetic particles were coated with yeast cells (*Saccharomyces cerevisiae*) and algae (*Chlorella sorokininiana*) and used for trapping copper. The surface-modified particles displayed a higher adsorption of copper than non-modified ones. Column experiments with modified steel filings also showed that surface modification greatly increased their sorptive capacity toward copper. Other surface modification of particles for the removal of heavy metals has been investigated. Diatomaceous earth, treated in different concentrations showed enhanced removal of heavy metal toxicity of >95%. Other surface modifications of particles are currently under investigation. This research was supported by NSF Grant #EEC-9402989 to the University of Florida Engineering Research Center for Particle Science and Technology.

* **4:45 pm, BIO-41D** Relationship Between Chydorid Cladoceran Assemblages and Macrophyte Species Composition in a Central Florida Constructed Wetland. M.G. DOTY AND T.L. CRISMAN, Department of Environmental Engineering Sciences, University of Florida, Gainesville 32601. Chydoridae were samples from emergent vegetation in three constructed wetlands on phosphate mined lands in Central Florida. The three constructed wetlands were one, five, and ten years old. Samples in each wetland were taken from stands of *Pontederia sp.* In one wetland, in which several species of emergent vegetation occurred, chydoridae were sampled repeatedly in *Canna sp.* and *Typha sp.* stands as well. Comparisons were made to determine differences among vegetative habitats. Sediment cores were also taken at each sample site and used for comparison of sediment habitat.

Friday, 12:00 - 1:00, PH Lobby
SESSION E
POSTER SESSION - BIOLOGICAL SCIENCES

BIO-P42 Garlon and Atrazine Effects on *Ruppia maritima*. J. SHINAMAN AND DR. J. JEWETT-SMITH, Univeristy of Tampa, Tampa 33606.

BIO-P43 Effects of the Herbicides Atrazine and Garlon on the Growth of *Cyclotella meneghiniana* (Bacillaiophyta). J. GOTCH AND DR. J. JEWETT-SMITH, University of Tampa, Tampa 33606.

BIO-P44 RAPD Analysis of the Genetic Diversity of Florida *Halophila* Species. DR. J. JEWETT-SMITH, University of Tampa, Tampa 33606.

BIO-P45 The Effects of Light Reduction on Photosynthesis and Respiration in *Halodule wrightii* for Tampa Bay. M.B. NEELY, 320 Bayshore Blvd. N #108, Clearwater 34619.

BIO-P46 Fate of Extracellular DNA in Salt and Brackish Waters. E. SMITH AND F. MIGONE, Armstrong State College, Biology Department, 11935 Abercorn Street, Savannah, GA 31419.

Friday, 10:45 am - 11:30 am, Room PH-225
Al Hall, City of Tallahassee, Presiding

* **10:45 am, ENG-1** Investigating Altered Drainage Conditions. PAUL J. GRAVES, JR., Agnoli, Barber & Brundage, Inc., 7400 Tamiami Trail North, Naples 33963. Two scenarios are described in which offsite activities unintentionally blocked the drainage outfall or redirected surface flow patterns, thereby increasing wetland characteristics of the sites prior to development. Methods of determining the existence, causes and significance of altered drainage conditions are examined. Compensative measures for the two scenarios are discussed.

* **11:00 am, ENG-2** Estimating Wet Season Water Table Elevations. PAUL J. GRAVES, JR., Agnoli, Barber & Brundage, Inc., 7400 Tamiami Trail North, Naples 33963. Features of the wet season water table (WSWT) are described, particularly as occurring in southern Florida. Issues of concern are detailed regarding careful selection of WSWT elevations used in the design of surface water management systems. Challenges in identifying appropriate WSWT elevations are discussed, primarily in the context of engineering design for developments. Methods of estimating WSWT elevations are examined.

* **11:15 am, ENG-3** Control Devices for Stormwater Detention Ponds. K.C. McCARTY, JAE SANG LEE, AND S.C. KRANC, University of South Florida, Tampa 33620. Stormwater runoff from developed areas requires regulation to prevent flooding and treatment to mitigate pollution. Detention ponds can be used to fulfill both functions, providing that discharge from the pond can be controlled. This study comprises a series of experiments to examine the hydraulic performance of various weirs and orifices used in conjunction with detention ponds. It was found that while such devices perform in a manner similar to analogous measurement apertures, significant differences attributed to construction techniques can be observed and that these differences may affect overall system performance. This work was supported by the Florida Department of Transportation/Federal Highway Administration. The opinions, findings and conclusions presented are not necessarily those of either agency.

Friday, 11:30 am
SECTION MEETING: ENGINEERING SCIENCES
Al Hall, City of Tallahassee, Presiding

Friday, 9:00 am - 12:00 pm, Room PH-210
SESSION A
Elsie Gross, Hillsborough Community College, Presiding

9:00 am, ENV-1A An Investigation of Lead Migration in Delaney Creek. H.S. NAM, S.L. CHONG, AND R.F. BENSON, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. A lead-acid storage battery dump site was located on the banks of Delaney Creek, where it crossed Highway 41. It flows into Tampa Bay. This investigation is concerned with evaluating the extent of transfer of the contamination by means of creek flow and tidal action. Samples collected at points several miles upstream show traces of lead contamination. These findings will be discussed.

9:15 am, ENV-2A An Investigation of the Allelopathic Properties of Cattails, *Typha domingensis,* in Hillsborough County, Florida. VICKIE PRINDLE AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. One species of cattails, *Typha domingensis,* was studied in order to investigate its possible allelopathic behavior towards marsh plants in South Florida environments. Cattail plants were collected from two locations, separated, and then extracted. Bioassays were performed using the extracts and lettuce seeds. Seedling growth was monitored and showed abnormal development. Additional bioassays were performed with radish seeds, and growth rates with the cattail extracts were studied using *Lyngbya majuscula.* To help characterize compounds in the sample extracts, total carbon and inorganic carbon analyses were done.

* **9:30 am, ENV-3A** Synthesis and Selected Reactions of Supported Ligands. DUKE POORE' AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. The present study is composed of two parts. The first section involves the use of supported fatty acids to remove Ag^{+} from aqueous systems under neutral and acidic conditions. The second is concerned with the synthesis of salicylaldmine (N,N,N-trimethyl-1,3-propanediamine) and benzaldimine (N,N,N-trimethyl-1,3-propanediamine). These cations were loaded on an ion exchange resin and were subsequently examined for their ability to remove Ni^{2+} from aqueous solution.

9:45 am, ENV-4A Lead Dispersion from a Hazardous Waste Site, N. BEHARRY AND D.D. WOODBRIDGE, College of Public Health, University of South Florida, Tampa 33612. A study of lead contamination levels in the soil surrounding a hazardous waste dump site has been made and concentration levels have been found to exceed EPA safety values. Dispersion of lead from hazardous waste sites can occur by wind-blown dust, drainage of both surface and ground water, and spreading by trucks and machinery during the clean-up process. Data from ten locations surrounding the 62nd Street Dump Site in Tampa, Florida indicated levels of elevated lead concentrations south of the dump site near and on the outside of the entrance-exit gate. Concentration contour lines indicated the gradients of lead levels in the soil in the vicinity of the dump site.

10:00 am, ENV-5A Adaptation of a Marketing Plan to Preparation of Chemistry Research Proposals. EILEEN PEREZ AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. In a time of reduced funding, it seems important to consider all aspects of writing proposals. One aspect is applying business methods, notably a marketing plan, to this activity. The characteristics of a strategic plan and a marketing document will be discussed and examples given to show the application to environmental chemistry and the chemical sciences.

* **10:15 am, ENV-6A** Removal of Trace Copper Ion from Water by the Surfactant-based Extraction. CHUHUA WANG, DEAN F. MARTIN AND BARBARA MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. A surfactant-based extraction was performed at 65-70°C for the removal of trace copper ion in the aqueous solution. Dodecyl benzoylacetone (Lix®54) was chosen to form a lipophilic copper complex so that copper could be extracted into the nonionic surfactant micellar phase. Extraction formed best in the pH range of 4-11 with efficiency of 95-98% and the formation constants at pH range of 2-8 were determined. The partition coefficient was calculated to be more than 1000 when the initial copper concentration was more than 80 ppm.

10:30 am, BREAK

* **10:45 am, ENV-7A** Evaluation of a Potential In Situ Remediation of Sediment Contamination in Palm River. R.T. COOK, K.B. INGINERI, AND R.F. BENSON, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 66320. Several studies have found that sediments in the Palm River are highly polluted. This evaluation is concerned with extraction and removal of heavy metal contamination by means of transfer from the sediment to ion exchange packets located in direct contact with the sediments. The heavy metal loaded ion exchange packets are recovered and the heavy metals are reclaimed.

11:00 am, ENV-8A A Timeline of Air Composition of Jacksonville, Florida. JENNIFER L. COBB, R. DEL DELUMYEA, Millar Wilson Laboratory for Chemical Research, Jacksonville University, Jacksonville 32211. Since the spring of 1989, the Millar Wilson Lab has maintained an air monitoring station on the St. Johns River, taking particulate samples by filtration. Later, wet, dry and total fallout samplers were also established. All samples were analyzed for total particulate concentrations and filtration samples were also examined for elemental carbon concentrations. This analysis provides continuous profile of the air particulate history in the Arlington area of Jacksonville, Florida.

* **11:15 am, ENV-9A** Regional Water Quality Monitoring Programs: Rationale, Design and Implementation. G.A. BLANCHARD AND R.C. BROWN, Environmental Action Commission, P.O. Box 1000, Bradenton 34206. Local governments attempting to satisfy water policy information needs by operating their own, separate monitoring programs frequently find difficulties extrapolating results beyond their jurisdictions. A regionally coordinated water quality monitoring program is an attractive solution to this problem. The design of a regional ambient water quality monitoring program for the Florida west coast will be discussed. Participants in this program agreed to standardize core water quality variables and sampling methods to collect consistent data across jurisdictional boundaries. Procedures such as inter-laboratory calibration exercises demonstrated data quality. The potential cost-benefit implications of a successful regional program are examined.

11:30 am, ENV-10A Effect of Selected Dyes on the Growth of the Cyanobacterium, *Lyngbya majuscula*. ELSIE D. GROSS (1) AND DEAN F. MARTIN (2), (1) Hillsborough Community College, P.O. Box 30030, Tampa 33630, (2) Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. The effect of five dyes on *Lyngbya majuscula* was studied under nutrient-optimum and essentially dye-concentration-constant conditions. Four fluorescein-derivative dyes (substituted xanthobenzoates: fluorescein, erythrosine, eosin Y, and rose bengal) were used plus methylene blue for comparison. Two dyes, methylene blue and rose bengal, were quite effective

during a 3-day period of inhibiting growth and causing noticeable damage to the cyanobacterium. The anticipated inverse relationship (change in fresh weight as a function of quantum yield for the dye) was not observed. It was concluded that for three dyes, under nutrient optimum conditions, the rate of singlet oxygen generation was matched by the rate of synthesis of singlet-oxygen quenchers or rate of tissue repair.

Friday, 11:45 am
SECTION MEETING: ENVIRONMENTAL AND CHEMICAL SCIENCES
Elsie Gross, Hillsborough Community College, Presiding

Friday, 3:00 pm - 5:00 pm, Room PH-210
SESSION B
Elsie Gross, Hillsborough Community College, Presiding

3:00 pm, ENV-11B Malthusian Versus Cornucopean Views as Applied to an Environmental Crisis. DEAN F. MARTIN AND BARBARA MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. Two views of the environment will be presented and contrasted. The application considers how chemists may approach environmental problems with a view toward their solution. The specific instance examines the problem of disappearing amphibians, the ozone hole, the problem of disposing of kraft black liquor (a waste product), and how contemporary research may lead to solutions of two of the three problems.

3:15 pm, ENV-12B Preventative Methods: Development of an Amine-Isocynate Oil Spill Containment - A Two Year Study. VISHAL GROVER, Miami Coral Park Senior High School, 8865 S.W. 16th St., Miami 33166. This presentation involves the development of a method of fossil fuel containment through the testing of the amine-dilsocynate reaction. This method, developed by the experimenter over the previous year, is based upon the reaction of different amines at various concentrations with toluene diisocynate to form a lattice emulsion which traps the given hydrocarbon. Moreover, the experiment determines the environmental and industrial feasibility of the procedure. The toxicity of the procedure and its environmental ramifications are investigated by the experimenter. Possible implementation of such a procedure in the fossil fuel industry is also examined in this presentation.

3:30 pm, ENV-13B Studies of the Red Tide Organism: The Past, Present, and Future. MARK-ALLEN WALKER AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. *Ptychodiscus brevis,* the Florida red tide organism, has been studied by the Institute for several years. This review will discuss the past work of the Institute, as well as examine the future work to be done. Topics to be covered include the history of Florida red tides, the seed-bed hypothesis, nutrient effects, and the inhibition of *P. brevis* by *Nannochloris occulata*. The present and future work in this area involves looking at this natural inhibitor. *Nannochloris* is being studied in hopes of identifying its active component which inhibits the red tide organism. Identification of the active component termed aponin will hopefully lead to a control mechanism against red tides for use in aquaculture.

3:45 pm, ENV-14B The Characterization of *Saccharomyces cerevisiae* in Regards to Lead and Copper Presence in a Maltose Medium. J. NANCI, K. INGINERI, D. BOOTLE, AND R.F. BENSON,

Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa 33620. Fermentation of maltose media by *Saccharomyces cerevisiae* to a large variety of beverages whose differences are representative of the brewing process rather than the apparent composition of the media. Effects of water quality in regards to copper and lead contamination were monitored during the brewing process. Copper and lead were found to have an effect upon the fermentation activity. The activity is used to explain the particular characteristics of Scotch Ale.

4:00 pm, ENV-15B Development and Application of Methods for Determination of Mercury in Environmental Samples. SUREN RODRIGUEZ AND ROBERT BRAMAN, Department of Chemistry, University of South Florida, Tampa 33620. The analysis of environmental samples for mercury has long been of interest in environmental pollution studies. Speciation of mercury into its several forms has also been of interest. The determination of dimethyl mercury, methyl mercury type compounds, elemental mercury, and inorganic mercury in air has recently been achieved using specific absorption type surfaces in the analysis procedure. A carbon soot surface has been found to collect all of the mercury forms in air. Soil and water speciation of mercury has been achieved by selective reduction analysis techniques. Highly sensitive and selective detention of mercury has been achieved using a DC discharge type detection system. Detection limits are in the 10-20 picometer range. The analytical methods and applications to environmental samples will be presented.

4:15 pm, ENV-16B Impact of NO_x Chemistry on Tobacco. ROBERT S. BRAMAN, Department of Chemistry, University of South Florida, Tampa 33620. The development of methods for various NOx compounds in air and nitrates, nitrites and nitrosamines in various types of samples has been used in studies of NOx chemistry associated with tobacco products. Various tobacco products have been analyzed for nitrate content. Primary smoke analysis has shown that nitric oxide is the main NOx component in tobacco smoke. This can produce nitrites and nitrosamines. Analysis of tobacco products from various countries shows that there is a large range of nitrate content from approximately 0.1% to 3.0% by weight (Expressed as NO). Mortality rates of tobacco smokers from these countries increases as the average percentage of nitrate in tobacco products increases. The correlation appears to be very strong.

4:30 pm, ENV-17B Development and Application of an Analytical Method for Nitrates, Nitrites and Nitrosamines in Foods, Drinks, Cosmetics, and Physiological Fluids. ROBERT S. BRAMAN AND MITCHELL KATZ, Department of Chemistry, University of South Florida, Tampa 33620. A chemiluminescence type nitric oxide detector has been used to detect NO coming from helium purged reaction chamber solutions. Nitrites in the various samples are converted to nitric oxide specifically in acidic media. Vanadium III acidic solutions reduce nitrates. An ethylene glycol mildly acidic solution, with KI present and warmed, converts nitrosamines to NO while not reacting with them. The analysis of various food products and cosmetics has been done. Analysis of human urine has also been done. Results will be presented.

Friday, 8:30 am - 11:30 am, Room PH-246
SESSION A
T. Missimer, Missimer and Associates, Presiding

8:30 am, GHY-1A Biostratigraphic Indicators for Timing Siliciclastic Deposition, Florida Keys. L.A. GUERTIN, University of Miami, RSMAS-MGG, 4600 Rickenbacker Cswy., Miami 33149. The successful identification of planktic foraminifera is proving to be a very useful tool in constraining possible ages of Neogene deposits of south Florida. Two continuous cores (~1000 ft.) drilled in the upper and middle Florida Keys reflect the subsurface geology of the region - a lower carbonate unit, overlain by siliciclastic sediments, and an upper carbonate unit. The timing of siliciclastic deposition can be determined by utilizing biostratigraphic age-markers. Planktic foraminifera have been examined throughout the siliciclastic section of the two cores. The age-ranges of the foraminiferal species identified with depth can be constrained utilizing first-appearance and last-appearance datums. The data show that siliciclastic deposition initiated and continued through the last Pliocene.

8:45 am, GHY-2A Projected Impacts of a Proposed Development on the Florida Everglades Restoration Project. J.B. GIDDINGS, South Florida Water Management District, P.O. Box 24680, West Palm Beach 33416. Restoration of the Florida Everglades involves both macro and micro scale analysis. Due to the size of the Everglades system, a large scale regional model is normally utilized to evaluate potential options for restoration. In some instances, small scale ground water models can be used to evaluate the potential impacts associated with proposed developments adjacent to the Everglades system. A ground water model was used to evaluate a proposed development scheme for southwestern Broward County, Florida. This micro scale approach does not address all the issues of the Everglades restoration but demonstrates the potential benefit a properly planned development may have on a large regional ecosystem. Multiple configurations of the proposed development were simulated. Seepage losses from the Everglades was the principle indicator of success. The results indicate that both development and Everglades restoration can coexist.

9:00 am, GHY-3A Microbial Mediation in the Genesis of West Florida Shelf Phosphorite Nodules. K.B. FOUNTAIN, Department of Geology, University of Florida, Gainesville 32611. Microbial mediation in the genesis of carbonate fluorapatite (CFA) has received attention as an important process in many economically significant phosphorites. As part of an SEM-based study of West Florida Shelf (WFS) phosphorites, nannostructures suggestive of a microbial role appear pervasive. This indicates that microbial mediation may be important in nucleating porewater CFA precipitation under conditions of low C_{org} flux on the WFS.

9:15 am, GHY-4A *In Situ* Weathering of the Plio-Pleistocene Cypress Head Formation: Clay Mineralogical Evidence. K.B. FOUNTAIN, Department of Geology, University of Florida, Gainesville 32611. Clay mineralogical evidence indicates that kaolinitic sediments composing the Cypress Head Formation in Northcentral Florida have evolved, in part, as a result of *in situ* weathering. Observations of kaolinite vermiforms and stacks, both highly ordered and moderately to poorly ordered kaolinite phases, and the identification of halloysite in some samples lends credence to such a contention, with the role of vadose zone leaching of probably importance.

9:30 am, GHY-5A Sulfuric Acid Dissolution within the Lower Floridan Aquifer, South Florida. ROBERT M. BAKER, Department of Geology, University of Florida, Gainesville 32611. A zone

transmissivity, termed the Boulder Zone (BZ), exists within the Upper Paleocene to Eocene carbonates and evaporites of the South Florida carbonate platform. Sulfur isotopic compositions of secondary evaporitic minerals from the BZ, when compared to primary Tertiary evaporites and Cretaceous evaporites, may support the hypothesis that hydrogen sulfide migrated upward from Cretaceous sediments and was oxidized to form sulfuric acid. The sulfuric acid caused limestone dissolution, thereby forming the BZ.

9:45 am, BREAK

10:00 am, GHY-6A Seismic Attenuation in Florida. RHONDA L. QUINN, JOHN J. BELLINI, AND DEBRA K. PARSON, Department of Geology, University of Florida, Gainesville 32611. The University of Florida seismic network consists of four remote stations and a base station in Gainesville to cover all of Florida and South Georgia. All of the stations are coupled to sedimentary rock via special foundations. Each station is equipped with a three-component short period digital instrumental array. Analyses of collected seismic data yield several dozen recorded events that can contribute to revised estimates of attenuation of seismic energy in Florida rocks. The revised estimates suggest that values of the attenuation coefficient for events recorded in Florida exceed those values commonly associated with Eastern United States. This observation may be attributed to special geological and hydrological features of the Florida plateau or to the unique tectonic origin of the Florida basement.

* **10:15 am, GHY-7A** Ground Water Quality Characteristics of the Lower Intermediate/Upper Floridan Aquifer Underlying the Carlton Reserve Wellfield, Sarasota County. P.J. FETTERMAN AND M.J. BARKER, Division of Land Management, Sarasota County Natural Resources Department, 1301 Cattlemen Road, Sarasota 34232. Ground water quality data collected on the Carlton Reserve from 1991 to 1994 are analyzed for inorganic chemical characteristics and identification of localized anomalies to assist in the establishment of general background water quality. The geology of the area is described. Ranges for total dissolved solids, chloride, sulfate, bicarbonate alkalinity, calcium, magnesium, potassium, sodium, pH and conductivity are established for all sample sites. Water quality at each sample site is classified by plotting analyses representative of median, minimum and maximum ranges on trilinear diagrams. May and August sample data for each year are contoured and used to identify areas of upwelling or conduit flow. Conclusions are drawn about major lithologic factors controlling localized ground water quality and potential effects of water withdrawal from pumping activities scheduled to commence in 1995.

10:30 am, GHY-8A Geoed-L: A Discussion List for Geologists Involved in all Aspects of Education. CHARLES J. MOTT, Division of Natural Sciences, St. Petersburg Junior College, Clearwater 34626. The GEOED-L is a LISTSERV list meaning that it provides one address for mail to be sent and simultaneously distributed to all subscribers. GEOED-L is a great way to share ideas, ask the GEOED-L members pertinent questions, communicate on grant proposals, meeting questions, etc. Those new to the world of bulletin boards, discussion lists, and email in general, or those who need additional information will want to become better acquainted with this list.

10:45 am, GHY-9A Structural Implications of Slickensides and the Juneau Icefield, Juneau, AK and Atlin, BC. A.J. ROMEO, University of Florida, Department of Geology, Gainesville 32611, and Foundation for Glacier and Environmental Research, Pacific Science Center, Seattle, WA 98019. Slickensides of the Juneau Icefield record rapid early to mid-Tertiary uplift of the Coast Range batholith.

Orientations of 225 slickensides reflect a regionally extensive set of ductile shear and brittle faults extending ~60km southwest to northeast through the study area north of Juneau, Alaska. This shear zone contains near vertical eastward dipping slickensides with horizontal slickenlines recording right- and left-lateral strike-slip motion. This shear zone, informally named the Seratine shear zone, is in the northern extremities of the Coast shear zone and evolved from thrusting along the Coast Range Megalineament zone during rapid early-Tertiary uplift. No significant measurement of displacement was recorded in the Eocene granite and granodiorite plutons. Funded in part by a grant from the National Science Foundation Research Experience for Undergraduates (NSF-REU).

11:00 am, GHY-10A Seasonality as a Test for Cretaceous Equability. JAMES FATHERREE, Department of Geology, University of South Florida, Tampa 33620. Throughout Earth history, global climate has fluctuated significantly. It is generally believed that during much of the Cretaceous period (65-135 Mya), the global climate was much warmer than the present. It has also been hypothesized that the global climate was more equable. Previous workers have provided many arguments for and against Cretaceous equability and possible causal mechanisms, but many of these have not been sufficiently tested. In order to apply these data to the prediction of the effects of modern global warming, these mechanisms must be understood intimately. This may be accomplished by a thorough multi-disciplinary re-examination of existing data, combined with the development and use of new approaches. This study intends to use stable isotope data from Cretaceous mulluscan shells as an alternate, independent source of evidence for testing the equable Cretaceous scenario. In this study, data have been generated from selected fossils of the upper Pierre Shale Formation (Campanian-Lower Maastrichtian) from the Western Interior Seaway of North America. These data have been interpreted as a proxy temperature record, indicating a seasonal temperature range of approximately 7°C at paleolatitudes greater than 50°N. This range is well below recent seasonal temperature ranges at these latitudes. Therefore, the preliminary data suggest that the equable scenario is correct.

Friday, 11:15 am
SECTION MEETING - GEOLOGY AND HYDROLOGY
T. Missimer, Missimer and Associates, Presiding

Friday, 8:15 am - 11:30 am, Room PH-240
SESSION A
Dr. Joan Schwebel, Maynard Evans High School, Presiding

8:15 am, PSS-1A Designing a Spatially Modulated Imaging Fourier Transform Spectrometer and its application in remote sensing. C. HART AND J.B. RAFERT, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. The scientific community has recognized the importance of spectral information for atomic and molecular species identification, as well as for target discrimination by remote sensing. Work has been done to develop a Spatially Modulated Imaging Fourier Transform Spectrometer (SMIFTS) that produces a hyperspectral "image cube." This image cube is produced when one spatial dimension and one spectral dimension is scanned over a second spatial dimension to produce an image which has many spectral bands. Such a spectrometer provides an excellent opportunity for use in space sciences (astronomical observation, object identification, etc.), as well as for hosts of other applications including environmental science, medicine, and archeology. This paper discusses the details of this spectrometer and its possible applications.

8:30 am, PSS-2A Scanning Tunneling Microscopy of Electrodeposited Multilayered Photovoltaic Materials. R. FRIEDFELD, J.G. MANTOVANI, AND R.P. RAFFAELLE, Department of Physics and Space Sciences, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. We have investigated the electrochemical deposition of modulated thin films based on the $Cu_xIn_{2-x}Se_2$ system. $CuInSe_2$ is a leading candidate for use in photovoltaic solar cells due to its optical absorption and electrical characteristics. The use of multilayers as the absorbers in concentrator solar cells has been theoretically shown to greatly improve their efficiencies. We have used scanning tunneling microscopy (STM) to characterize the individual nanoscale layers of our deposited films. This work was supported by the Southeastern University Research Association in cooperation with Oak Ridge National Laboratory.

8:45 am, PSS-3A Characterization of Silicon-Based Solar Cells. M. AGIRTMIS, E. NOE, H. FORSELL, AND R.P. RAFFAELLE, Department of Physics and Space Sciences, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. Photovoltaic cells were fabricated by thermal diffusion of boron into phosphorus doped silicon wafers. Mechanical polishing and chemical staining was used to determine the doped semiconducting bandgap from conductivity versus temperature measurements. Electrical connection to the wafers was accomplished via electroless plating of nickel contacts and the subsequent device performance was measured.

9:00 am, PSS-4A Electrochemical Deposition of Multilayer Thin Films for High Efficiency Solar Cells. R. MELUCCI, R. FRIEDFELD, J.G. MANTOVANI AND R.P. FARRAELLE, Department of Physics and Space Sciences, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. Thin films based on the $CuInSe_2$ system were electrochemically deposited from several different aqueous solutions. The resulting films were analyzed and compared using cyclic voltammetry, x-ray diffraction (XRD), and energy dispervise analysis (EDS) in the scanning electron microscope (SEM). Results were judged on the ability to incorporate these materials into high-efficiency multilayer solar cells. This work was supported by Florida Solar Energy Center (FSEC).

9:15 am, PSS-5A Software Development in Gamma Emission Assay of Lunar Samples. M. BROWN (1), R. LLEWELLYN (1), AND R. GRISMORE (2), (1) University of Central Florida, Orlando

32816, (2) California State Polytechnic University, San Luis Obispo, CA 93407. Samples collected from the lunar surface by Apollo astronauts may provide evidence of geologically recent local stellar activity. The lunar samples showed ^{26}Al concentrations of 54±4 pCi/kg and 45±5 pCi/kg. The data collected by a 2-dimensional gamma ray spectrometer indicate that these samples may have acquired the ^{26}Al in part from shocked material on the outer edges of a large crater. . . (Remainder lost in transmission - Full abstract availalbe at registration).

9:30 am, BREAK

9:45 am, PSS-6A Towards a Propagating Wave. R. JOHNSON, S. McCOMB AND H. HICKMAN, Science Department, Hillsborough Community College, Tampa 33630. Perhaps the most frequently encountered solution to the one-dimensional Wave Equation is a sine wave of. . . (Remainder lost in transmission - Full abstract availalbe at registration).

10:00 am, PSS-7A The Upper Atmospheric Research Collaboratory at Florida Institute of Technology. M. FILLIGIM, M. MOLDWIN AND H. RASSOUL, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. The Upper Atmospheric Research Collaboratory is a multi-institutional, multi-disciplinary research project developed in order to study ionospheric-magnetospheric interactions and how scientists "do" science. In particular we at Florida Institute of Technology are interested in understanding substorm dynamics. In our quest to better understand substorm signatures, we utilized instruments at Sondrestrom, Greenland, (incoherent scatter radar, all-sky camera, imaging nometer, ground magnetometer) and geosynchronous energetic particle data. In order to study interactions between scientists, psychologists observed us both in person and in cyberspace. Preliminary results of this campaign will be discussed in this paper. This work was supported by NSF-UARC and by NASA-JOVE programs.

10:15 am, PSS-8A The Upper Atmospheric Research Collaboratory: Allsky Camera Studies. R. HERMAN, M. MOLDWIN AND H. RASSOUL, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. The Upper Atmospheric Research Collaboratory is a unique opportunity to view aurora by bringing people together from around the world over the Internet. The Allsky Camera is one of the instruments used to study aurora by viewing the sky overhead at different wavelengths. Besides providing information about the spatial properties of the aurora, it also gives information about the energy of the particles responsible for generating the aurora. During this talk I will describe how the Allsky Camera was used in conjunction with other instruments in a campaign conducted by Florida Institute of Technology between 24 February and 4 March 1995. This work was supported by NSF-UARC and by NASA-JOVE program.

10:30 am, PSS-9A Earth's Magnetopause: Identification Using Satellite Data. J. BAERMAN AND H. RASSOUL, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. This paper reports on the first phase of a magnetospheric research project that entails a search for the nighttime magnetospheric Low Latitude Boundary Layer (LLBL) - one of the last known magnetospheric plasma regions. The nighttime LLBL is located between the magnetopause (MP) and the plasmasheet (PS), hence the first step was to identify MP crossings using our satellite data base. The data set selected for this study was obtained from the IMP-8 observations of magnetic field, particle, and plasma measurements. IMP-8 is in a circular orbit of about 35 R_E and therefore crosses the Earth's magnetopause at least two times per orbit. Details of the satellite's trajectories, characteristics of MP

10:45 am, BREAK

11:00 am, PSS-10A TOPEX/POSEIDON Mission: Ionospheric Studies Using An Oceanography Satellite. J. WERNOW, L. JONES, M. MOLDWIN AND H. RASSOUL, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. The United States and France celebrated the International Space Year, 1992, with the launch of Topex/Poseidon-the most advanced space mission ever to study ocean currents. The orbital (circular) height of the satellite is 1,336 km, with an orbital inclination of 66°. Using a dual frequency altimeter the height of the satellite above the sea was measured with a precision of about 2 cm. In order to achieve this precision a number of corrections must be applied to the apparent range of the altimeter signal to obtain the true range. One of the corrections involves calculating the change in path length of the signals due to the ionosphere. Using the two altimeter frequencies (5.3 and 13.6 GHz), we have extracted the ionospheric Total Electron Content (TEC) in the path of the signal. This paper discusses calculation of the ionospheric TEC, and presents some examples of TEC variations across the earth's magnetic equator induced by the equatorial fountain effect. This work was supported by NSF-UARC and by NASA-JOVE programs.

11:15 am, PSS-11A Moving Charged Capacitors. K. BAIR, A. LANDERVILLE AND H. HICKMAN, Science Department, Hillsborough Community College, Tampa 33630. The total energy possessed by a moving, charged, parallel-plate capacitor depends on the orientation of its plates. A capacitor moving with its plates parallel to the direction of motion possesses energy due to mass, energy due to the electric field, and energy due to magnetic field. All three components increase with increasing speed. A capacitor moving with its plates perpendicular to the direction of motion only possesses energy due to mass and energy due to the electric field. Surprisingly, the electric field component decreases with increasing speed.

Saturday, 11:30 am
SECTION MEETING: Physics and Space Sciences
Dr. Joan Schwebel, Presiding

Friday, 3:00 pm - 4:45 pm, Room PH-240
SESSION B
Dr. Joan Schwebel, Maynard Evans High School, Presiding

3:00 pm, PSS-12B Plasma Flux Drop Outs Observed at Geosynchronous Orbit with ATS-5: Implications for Inner Magnetospheric Structure and Dynamics. M. FERNANDEZ, M. MOLDWIN AND H. RASSOUL, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. Four years of ATS-5 geosynchronous plasma data has been surveyed for occurrences of plasma flux drop outs, which have been interpreted as entries into the geomagnetic tail lobes. This study is an extension of two previous works [Thomsen et al JGR 99 1993 and Moldwin et al JGR 100 1994), examining the symmetric distortion hypothesis proposed in the latter study. This study suggests that the large, local time dawn-dusk asymmetry observed for flux drop outs in the previous studies is just due to a bias introduced by the limited longitudinal coverage of the Thomsen et al work. This study examines data from a satellite that was situated at a longitude not previously examined. This work was supported by the NSF-UARC and by NASA-JOVE programs.

3:15 pm, PSS-13B Growth and Characterization of Ferro-magnetic Thin Film by the Process of Laser Ablation. J.P. DOUGLAS, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. This paper reports on my participation in experiments underway at the National High Magnetic Field Laboratory in Tallahassee during this past summer, through a grant from the FSGC undergraduate research program. Research experiences I gained included the growth and characterization of ferro-magnetic materials by the process of laser ablation. In this process a laser bean was fired into an iron oxide target in order to deposit a thin film of the iron oxide on a substrate. Once the film was grown a spectrophotometer was used to verify the composition and integrity of the film. My talk will present a detail of this research project as well as the need for such research in order to develop more sensitive magnetic materials. This work was supported by FSGC Undergraduate Research and by NASA-JOVE programs.

3:30 pm, BREAK

3:45 pm, PSS-14B Report on the Two-Year College in the Twenty-First Century (TYC 21) Project. LAWRENCE T. BIGELOW, Seminole Community College, 100 Weldon Blvd., Sanford 32773. A NSF-funded project through the National AAPT is to begin next fall. In an effort to break the barriers of isolation, the TYC 21 project will bring two-year college physics faculty together in a series of regional and national meetings over a three-year period for the purposes of enhancing two-year faculty as teachers, and developing a stronger national voice for the two-year college perspective on physics/science instruction. The participants will focus initially on reviewing, revising, and addressing the critical issues identified during the 1989 critical issues in two-year colleges conference (AAPT and NSF) and 1993 conference on the role of professional societies in two-year colleges (NSF). The United states has been broken down into 15 regions. Florida is one region. All two-year college physics faculty are invited to get involved.

4:00 pm, PSS-15B Lab/Lecture Integration for the Introductory Calculus Based Physics Course. P.R. SIMONY, Jacksonville University, Jacksonville 32211. A restructuring of the traditional college lab and lecture format is being tested. The course meets for two three-hour periods each week. Students in the course receive credit for one three-credit-hour lecture course and a one credit hour laboratory course. Laboratory experiences are designed to lead into discussion of lecture concepts (primarily via mathematical modeling of data) whenever possible. The pedagogical model is a cyclic process initiated by experimentation, followed by discussion of concepts, and problem solving. A description of a typical cycle will be presented along with preliminary assessment of the success of the model. (Supported in part through NSF grant DUE #9342109).

4:15 pm, PSS-16B F=m/a (or something): Preparing Students for Success in College Physics. JOAN OSTROW SCHWEBEL, Maynard Evans High School, Orlando 32808. As a result of the program developed at Evans, students who would ordinarily be considered unlikely candidates go on to successfully complete physics courses in colleges and universities all over the country. This paper attempts to answer the question "How?"

4:30 pm, PSS-17B The Continuing Evolution of the Gravitational Analogy to Electrostatics and Circuits. ALEXANDER DICKISON, Physical Science Department, Seminole Community College, Sanford 32773. For the past seven years, work has been done to develop electrostatics and circuit units using a gravitational analogy. This winter, two new ideas were incorporated and activities were rewritten. Positive student reaction indicates that completion of the unit is close.

FLORIDA COMMITTEE ON RARE AND ENDANGERED PLANTS AND ANIMALS

Friday, 3:00 pm - 5:00 pm, Room PH-208
SESSION A
James W. Beever III, Florida Game and Fresh Water Fish Commission, Presiding

3:00 pm, REB-1A Threatened and Endangered Plants of Florida. D. WILLIS, CCI Environmental Services, Inc., 5010 U.S. Highway 19 North, Palmetto 34220. Listed plant species are protected by the Preservation of Native Florida Act, which is administered by the Florida Department of Agriculture and Consumer Services and by The Endangered Species Act, which is administered by the U.S. Fish and Wildlife Service. The scope and limitations of both laws are reviewed. Restrictions to the harvesting or destruction of native plants are examined. Trends in the type of plant species likely to be listed as threatened or endangered (i.e., ferns and orchids) are evident and examined. Particular habitat types within Florida are most likely to contain listed plant species. The association of representative listed plant species with rare habitat types is evident.

3:15 pm, REB-2A Temperature Dependent Emergence and Social Behavior in Loggerhead Sea Turtle *(Caretta caretta)* Hatchlings. J. HIBLER, Barry University, 11300 N.E. 2nd Avenue, Miami Shores 33161-9011. Throughout the 1994 nesting season hatchling loggerhead sea turtles *(Caretta caretta)* were observed at a beach in Key Biscayne, Florida. There was a correlation between variation in nest temperature and emergence events. In addition to temperature cues, social interaction resulted in a bottom up mechanism of *en masse* emergence. Potential vocal communication, in the form of peeps, was observed in the emerging hatchlings. This represents the first report of hatchling sea turtle vocalization. Observations such as these suggest that social behavior is more important than previously believed and that emergence is temperature-dependent in loggerhead sea turtles. Supported in part by a grant from SNHS, Barry University.

3:30 pm, REB-3A The Effects of Fragmentation and Fire Suppression on Scrub Habitat and Scrub Jays: Brevard County, Florida as a Case Study. S. BOYLE, 1109 Atlantic Street, Melbourne Beach 32951. Historically, scrub habitat occurred contiguously along ridges in Florida and burned frequently as a result of lightning fire. Fragmentation due to encroaching urban and agricultural development has led to fire suppression, degradation of scrub quality, and ultimately to declining populations of Florida scrub jays. The effects of fragmentation and fire suppression on the distribution and persistence of a regional population of scrub jays in Brevard County, Florida, are examined. A rapid assessment was conducted to survey the landscape context of the scrub communities, and to measure parameters that affect scrub habitat quality including scrub height, oak cover, open space, and pine canopy cover. Of the 5,600 ha. of scrub surveyed, only 6% was determined to be in optimal condition for scrub jays. Relationships are examined between habitat quality and patch size with the spatial occurrence of scrub jays.

3:45 pm, REB-4A What are the Population Consequences for Florida Scrub Jays in Proposed Reserve Designs in Brevard County, Florida? K. ROOT, Florida Institute of Technology, Department of Biology, 150 W. University Blvd., Melbourne 32901. Scrub habitat is critical for the Florida scrub jay and several other threatened and endangered species. Several reserve designs have been proposed for a Habitat Conservation Plan to protect scrub habitat in Brevard County, Florida. Scrub jay distribution and scrub habitat were surveyed and mapped, including current scrub jay population, area of occupancy, scrub area, scrub distribution, scrub quality, and scrub restoration requirements. Scrub jays in Brevard County are utilizing non-scrub habitats, presumably because the current habitat quality is suboptimal. GIS analysis reveals that the proposed reserve plans including over 90% of the currently occupied scrub habitat. Using

habitat area requirements and varying the extent of the habitat management, the reserve designs could potentially protect 73% to 110% of the current number of scrub jay families.

4:00 pm, REB-5A Sea Level Rise and Marine Predation; the Dwarfing of the Florida Key Deer. M. STEPHAN, 2785 Gregory Avenue, Titusville 32796. Throughout the Pleistocene the dwarfing of mammals in island communities has occurred repeatedly. Primary factors relating to initial reproductive isolation are based on sea level rise. Changes in topography and range of the white-tailed deer *(Odocoileus virginianus)* led to a reduction to one-fifth of their body weight in less than ten thousand years. Previous studies of Florida key deer *(O. v. calvium)* claim they have had no predators other than man since the late Pleistocene. Modern analogs indicate that Key Deer routinely swim distances greater than one mile to other islands within their range. Marine predation is suggested as a factor influencing population reduction and dwarfing in *Odocoileus virginianus* of the Florida Keys since the Late Pleistocene.

4:15 pm, REB-6A Actions Addressing Listed Species Included in the Tampa Bay National Estuary Program Comprehensive Management Plan. H. GREENING AND R. ECKENROD, Tampa Bay National Estuary Program, 111 7th Avenue South, St. Petersburg 33701. A major focus on the Tampa Bay Conservation and Management Plan (CCMP), currently under development by participants in the Tampa Bay National Estuary Program Management Conference, is the protection and restoration of critical habitats in Tampa Bay, including those crucial for maintenance and protection of the listed species. In addition, actions requiring adequate enforcement of wildlife protection zones (including manatee, turtle nesting, and bird rookery protection areas), monitoring abundance and condition of wildlife and listed species populations, and public awareness of human activities which are potentially harmful to wildlife are CCMP elements directly addressing listed species in the Tampa Bay region.

4:30 pm, REB-7A Use of Small Wetlands and Wetland Mitigation Areas by Listed Species. C. COURTNEY, Environmental Protection Commission, Hillsborough County, 1900 9th Avenue, Tampa 33605. Failure of smaller mitigation creation projects to be properly constructed and maintained has been given as support for large scale mitigation banking strategies. In the rush to mitigation banking, the wildlife and listed species habitat values of smaller wetland systems, including flatwoods ponds and marshes, and small mitigation areas has been ignored. The Tampa Bay area has multiple examples of use of small wetland systems by listed species, particularly during critical life-history periods, including wading birds, Florida sandhill cranes, and wood storks. With improved design, improved compliance, and consideration of landscape ecological contexts small reserves continue to provide important functions in conservation strategies.

4:45 pm, REB-8A Implementing Regional Wildlife Habitat Planning in the Tampa Bay Region: Progress and Problems. J. BEEVER III, Florida Game and Fresh Water Fish Commission, 29200 Tuckers Grade, Punta Gorda 33955. The need for regional wildlife habitat planning (RWHP) is critical in the Tampa Bay region because of high rates of growth and habitat removal. Successes in implementation of the RWHP in the Tampa Bay Region have occurred in northern Pinellas County, the upper Hillsborough River, the Alafia River, the Little Manatee River, and the eastern Myakka River basin. Important contributions to RWHP goals were made in 1994 by Hillsborough and Pinellas Counties, Southwest Florida Water Management District Save-Our-Rivers, and the Preservation-2000 land acquisition programs. Difficulties encountered in RWHP implementation included multi-use land conflicts, developing private-land preservation incentives, coordination with wetland regulatory entities, some public and public-private partnership projects, and an acceleration of listed species habitat conversion to developed land uses.

Friday, 9:00 am - 11:30 am, Room PH-248
SESSION A
Dr. E.L. Rhamstine, Valencia Community College, Presiding

9:00 am, TCH-1A Involving Minority Students in Water Quality Studies. D.D. WOODBRIDGE. College of Public Health, University of South Florida, Tampa 33612. Considerable effort is being expended in trying to involve minority students in environmental health science issues. Private Historically Black Colleges and Universities (HBCUs) have in general been neglected in advanced programs for training students for environmental health careers. The College of Public Health (COPH) of the University of South Florida (USF) has held several Summer Environmental Health Institutes for minority students. These students received lectures, field, and laboratory involvement in studying and evaluating water quality. Water quality of rivers, streams, springs, and household wells have been investigated by minority students. This program is designed to train minority students in environmental field evaluation methodologies.

* **9:15 am, TCH-2A** A Secondary School Ecology Program Based on the Hydrologic Cycle. ROBERT W. ORLOPP (1), SCOTT DAVIS (1), AND MARVIN L. IVEY (2), (1) Pinellas County Schools, 301 Fourth Street S.W., Largo 34649, (2) 14452 Hillview Dr., Largo 34644-5033. Pinellas County Schools, with the assistance of grants from the Public Works Academy, a Tampa Bay Industry, and the South West Florida Water Management District is initiating a program for students in grades 6-12 with one of its objectives to lead to employment or further education in water use, conservation, re-use, and other functions of water management. The first step will be to train teachers and develop the in-depth curriculum needed. Within two years, "theme" programs will be instituted at two schools with feeder programs at middle schools. Hands-on laboratory and field experiences will be included in the high school program. The program will articulate with the Waste Water Management program at St. Petersburg Junior College and with the Public Works Academy. Program completers will become eligible for financial assistance at four year colleges. Pre- and post-program assessment methods are being developed.

9:30 am, TCH-3A Computer Simulation of Photoelectric Effect Experiment. ROBERT W. FLYNN, Physics Department, University of South Florida, Tampa 33620. The early twentieth century saw a revolution in our understanding of physics. We are writing computer simulations of those great modern physics experiments. In this paper we describe one such simulation, the experiment confirming Einstein's theory of the photoelectric effect. The student experimenter can vary the wavelength and intensity of the incident light and can measure the photocurrent by tracking the trajectories of the released photoelectrons. The student uses the computer to assist in gathering and reducing experimental data.

9:45 am, TCH-4A Computer Simulation of Gamma Ray Absorption Experiment. JOHN KLINE, Physics Department, University of South Florida, Tampa 33620. A standard modern physics laboratory measures the absorption of gammas from a Cesium source through various thicknesses of lead. We have written a computer simulation of this kind of experiment which the lab student can use to set up and preview the experiment. The student can vary the source, the intensity and the thickness and composition of the target and "watch" as representative gammas are lost from the beam by the photoelectric effect, pair production and Compton scattering.

10:00 am, TCH-5A Student Attitudes on Topics of Bio/Medical Ethics-Comparison of Two Central Florida Colleges. ERNEST L. RHAMSTINE (1), AND E.M. McNULTY (2), (1) Valencia Community College, 1800 South Kirkman Road, Orlando 32802, (2) Lake-Sumter Community College, 9801 U.S. Highway 441, Leesburg 34788. Beginning in 1978 a questionnaire addressing bio/medical ethics was administered to select groups of students at Valencia Community College. Students recorded opinions on organ transplants, fetal tissue research, AIDS, medical privacy, condom use, RU-486, assisted death and related topics. A report is presented on the preliminary comparison of responses from students at a large urban (VCC) and a small rural community college (LSCC).

10:15 am, BREAK

10:30 am, TCH-6A How Grant Overhead Funding Determines Scientific Theory, Practice, and Education. R. EDWARDS, Department of Zoology, University of Florida, Gainesville 32611. Overhead funding generated by federal research grants plays an enormously significant role in university policy. Far beyond its original conception of rewarding and helping schools to develop their research programs, so-called overhead has become a vehicle for state universities to relax pressure on state legislatures for general funding. The consequences for 1) university teaching of science, 2) administrative standards for hiring and firing faculty, and 3) scientific practice and training are relevant to current debates about state and federal support of education and research.

10:45 am, TCH-7A A Physical Science Experiment Featuring Gemstones. K.A. WETZ, Manatee Community College, South Campus, 8000 So. Tamiami Trail, Venice 34293. One of the challenges presented to the teachers of our two-semester physical science course is how to integrate the concepts of physics, chemistry, geology and astronomy into our one-semester laboratory program in a manner that our nonscience majors find interesting. One successful approach has been to offer an experiment on gemstone identification, which incorporates material on minerals, buoyant forces, specific gravity and refraction using equipment that is either already available or is inexpensive to acquire and methods similar to those used by professional gemologists.

11:00 am, TCH-8A An Introduction to Tropical Mariculture. WILLIAM TRANTHAM, Marine Biology Technology, Florida Keys Community College, 5901 West College Road, Key West 33040. This paper will discuss laboratory procedures in Tropical Mariculture at Florida Keys Community College. Culture of Pacific white shrimp *Penaeus vannamei* from larvae to adults and the algae, *Tetraselmis chuii,* diatoms, *Chaetoceros gracilis,* and brine shrimp, *Artemia franciscana,* required to feed them will be discussed.

* **11:15 am, TCH-9A** The Pinellas Trail Xeriscape and Native Demonstration Projects. I.M. REINPOLDT (1) AND P.A. DYE (2), (1) Pinellas County Utilities, 14 South Fort Harrison Ave., Clearwater 24616, (2) Pinellas County Planning, 14 South Fort Harrison Ave., Clearwater 34616. The Pinellas Trail xeriscape and native planting demonstration sites promote water conservation through public education about environmental landscape design principles. The County Utilities and Planning Department through joint funding with the Pinellas-Anclote River Basin Board of the Southwest Florida Water Management District (SWFWMD) initiated the program that incorporates volunteer services from local civic organizations for design, installation and maintenance. Two sites along a county linear park, known as the Pinellas Trail have been completed to date. Water meters at the site provide data on the amount of water necessary to establish and maintain the landscaping as well as provide data for future conservation

Friday, 3:00 pm
SECTION MEETING - SCIENCE TEACHING
Dr. E.L. Rhamstine, Valencia Community College, Presiding

Friday, 3:15 pm - 4;15 pm, Room PH-248
SESSION B
Dr. E.L. Rhamstine, Valencia Community College, Presiding

* **3:15 pm, TCH-10B** The Enterprise Village Water Resources Department. I.M. REINPOLDT (1) AND R.A. CLAYTON (2), (1) Pinellas County Utilities, 14 South Fort Harrison Ave., Clearwater 34616, (2) The Southwest Florida Water Management District, 2379 Broad Street, Brooksville 34609. Enterprise Village is a school based educational program offering a combination of six weeks of classroom instruction with a one-day field trip that enables fifth grades to experience the challenges of real life. Pinellas Utilities, in cooperation with the Pinellas-Anclote River Basin Board of the Southwest Florida West Management District (SWFWMD) and Pinellas County Schools, is sponsoring a water resrouces center in the village that teaches the value (dollars and sense) of water conservation, implementation methods and social responsibility for resources. The center curriculum is designed for students, as well as teachers and volunteers, to benefit from the real life experiences of Utility/Water Management functions and conservation planning.

3:30 pm, TCH-11B A Cooperative Astronomy/Planetarium Program between Seminole Community College and Seminole County Public Schools. LAWRENCE McADAM (1), BETH FARINA (2), AND SANDY ARES (1), (1) Seminole Community College, 100 Weldon Blvd., Sanford 32773, (2) Seminole County Public Schools, 1211 S. Mellonville Ave., Sanford 32771. This year the Physical Science and Community Outreach departments of Seminole Community College and Seminole County Public Schools worked together to produce a second-grade curriculum in astronomy. A pre/post-activities booklet and tailored planetarium program have been developed. A description of the curriculum, the logistics of funding for this program, and the spirit of cooperation will be discussed.

3:45 pm, TCH-12B Use of Multimedia to Present the Concept of Evolution. CHRISTINE L. FLOWERS, University of Central Florida, Department of Biology, Orlando 32816. Evolution is the core theme of biology. The presentation of evolutionary concepts in the multicultural classroom setting creates a new challenge for the instructor. The use of multimedia including video, laser disk, and interactive computer programs can provide the instructor with alternative methods to increase comprehension. The material currently available for instruction is evaluated to determine its usefulness in explaining concepts relative to macroevolution and microevolution, as presented to both biology majors and non-majors in a college level biology course.

Friday, 8:00 am - 12:15 pm, Room PH-231
SESSION A
David Black, South Florida Water Management District, Presiding

8:00 am, URP-1A Applications of Graphical Models for Wetland Conservation. D.S. FOCUS AND F.J. MAZZOTTI, University of Florida, Department of Wildlife Ecology and Conservation, 3245 College Avenue, Davie 33314. Planning for natural resource conservation has been aided by the utilization of geographic information systems (GIS) technology. However, the hardware, software and expertise required for GIS frequently limit the opportunities for applying this technology to land and water use, and regulation decision making process. Here we examine the application of simple graphical models to compile and display geographic information for environmental planning. Using a personal computer, scanner, and color printer, graphical models can be created that are both powerful and easy to understand, without incurring the monetary and time expense of using GIS. Application of this type of system to wetland planning in Broward County and evaluation of water flows into Florida Bay are discussed.

* **8:15 am, URP-2A** Design of a Buffer Along the Eastern Edge of the Everglades Using a Geographic Information System. L.K. GULICK, South Florida Water Management District, West Palm Beach 33416-4680. The South Florida Water Management District Governing Board charged staff with determining the feasibility of establishing an environmental and hydrologic buffer between the Everglades and urban areas to the east. The first stage in designing the buffer was a Geographic Information System analysis based on land use, National Wetlands Inventory, surface water management permit boundary, and public ownership data. Additional work incorporated soils, hydrology and exotic pest plant data. The buffer is feasible, but could be expensive.

* **8:30 am, URP-3A** Effective Use of a Geographic Information System in a Design Workshop. J.E. BIGGS AND K.D. SAARI, South Florida Water Management District, West Palm Beach 33416-4680. Suburban sprawl in southern Broward and northern Dade Counties is extending west to the levee that contains the Everglades. Proximity to a wetland of international significance raises the stakes on development issues such as wetland preservation and manipulating water levels for flood protection. In order to better protect water resources, the South Florida Water Management District sponsored a comprehensive detailed design workshop. A geographic information system played a central role in this process, allowing diverse information to be readily used during the accelerated design process. This project was successful enough that it will be a model for addressing potential conflicts between development and water resource protection in other parts of the district.

8:45 am, BREAK

* **9:00 am, URP-4A** Some Policy Issues Related to the Legal Assurance of Minimum Flows to Florida Estuaries: The Charlotte Harbor Context. A.L. STARR, Alachua County Department of Growth Management, 10 SW 2nd Ave., 3rd Floor, Gainesville 32601. This paper originated in a staff report to the Governor's 1980 Select Committee on the Charlotte Harbor Study Area, but the issues addressed are timely in 1995. Research indicated that the law may imply, but does not expressly provide, that a minimum flows shall be used to protect the ecology of the estuarine zone from significant harm. Permits could be granted to public or private entities for such in-stream uses, provided the uses were

* **9:15 am, URP-5A** Planning for Water Supply for the Everglades. D.R. SWIFT AND D.W. BLACK, South Florida Water Management District, West Palm Beach 33416-4680. Water supply planning for South Florida must include determination of water supply needs for the environment as well as for agriculture and urban users. Restoration of the Everglades will require significantly more water than is already being delivered to the ecosystem. Although details of Everglades restoration are not worked out, the SFWMD must estimate quantities of water that will be required. The Natural Systems Model, which reconstructs the pre-drainage hydrology of the Everglades, is playing an important role in this process. Thus, the Lower East Coast Water Supply Plan is requiring innovative methodology involving critical inputs from wetland hydrologists and ecologists. The preliminary results of this process are important not only to traditional water supply interests but also to environmentalists, scientists and planners who are being asked to deal with increasingly complex enviro-socio-economic issues.

* **9:30 am, URP-6A** Progress of the Watershed Interactive Network Plan for South Dade County. R.W. ALLEMAN, South Florida Water Management District, West Palm Beach 33416-4680. A workshop in July, 1994 was effective in crystallizing a vision for integrating landuse and water resource planning in South Dade, a projected growth area in the watershed of Biscayne National Park. The WIN plan is part of the SFWMD's commitment to going beyond protection of water resources that is based on telling people what they are not allowed to do. Instead, the District is sponsoring and participating in development of a plan to make South Dade a better place to live, work or visit, while providing for protection of environmental values including water quality for Biscayne National Park. One of the innovative concepts to emerge involves reconfiguring and revegetating existing canals to better integrate them into the human, wildlife and hydrologic landscapes.

9:45 am, BREAK

* **10:00 am, URP-7A** Water Demand Projection Methods for Agriculture and Urban Irrigation in South Florida. M. ROSEN, R. MARCH AND D. GILPIN-HUDSON, Planning Department, South Florida Water Management District, West Palm Beach 33416. Water supply planning requires knowledge of present and future water demands in the planning areas. Since there is limited data available for past and present water usage in agriculture or urban landscaping, other methods had to be developed to calculate demands. The South Florida Water Management District Planning Department has developed land area estimates based on historical acreage data and crop water requirements based on historical rainfall and ET data. Irrigation efficiencies and seasonal cropping patterns are factored into the equations. These methods have been developed for agricultural crops and golf courses. The Planning Department is in the process of developing data sources for area of other urban irrigated land.

* **10:15 am, URP-8A** Use of Time-Series Analysis Methods for Forecasting County-Level Public Water Supply Pumpages in Southeast Florida. RICHARD A. MARCH, South Florida Water Management District, West Palm Beach 33401-4680. A series of models using times-series analysis techniques (Autoregressive Moving Average (ARMA), Autoregressive Integrated Moving Average (ARIMA), and Time Series Decomposition) are developed to forecast monthly public water supply pumpages at the county level for Dade, Broward, and Palm Beach counties. The advantages and disadvantages of the use of these time-series analysis techniques are discussed. Results are compared to forecasts developed using regression analysis methods. Implication for forecasting with limited data on causal determinants of

water use are discussed. Projections derived using alterative methods are compared. Forecasts are evaluated using several goodness-of-fit measures. Implications for defining a "level of service" for public water supply are discussed.

* **10:30 am, URP-9A** Some Economic and Environmental Aspects of Wellfield Pumping. J.M. FESMIRE AND P.A. FESMIRE, University of Tampa, Tampa 33606. The economic costs and benefits to society of wellfield pumping are examined, including a description of pumping levels at which limited environmental damage begins to occur and where extreme damage begins. A theoretical optimum level of pumping is determined. Pumping data from a wellfield in central Florida are examined in light of this theoretical model. The pumping levels at this wellfield that match the theoretical threshold damage levels are determined. Environmental damage costs for various pumping levels are estimated.

* **10:45 am, URP-10A** Literature Review on the Effects of Groundwater Drawdowns on Isolated Wetlands. S. MORTELLARO, S. KRUPA, L. FINK AND J. VANARMAN, South Florida Water Management District, West Palm Beach 33416-4680. A literature review and analysis of prior studies were conducted to determine effects of lowered groundwater levels on wetlands. Of more than 100 references reviewed, 24 were particularly relevant to South Florida. Excessive drawdowns can cause mortality of wetland forests, changes in plant communities, soil subsidence, collapse of substrate and increased incidence of fire. Several studies indicated that actual drawdowns of 0.6 to 1.0 foot represented a threshold where significant changes occurred. Impacts were also observed in areas where groundwater models predicted one-foot drawdowns. The actual drawdown was often greater than the value predicted by the model. A regulatory drawdown criterion of less than one foot may therefore be appropriate for some types of water use and some wetland plant communities, especially when models are used.

11:00 am, BREAK

* **11:30 am, URP-11A** Economic Theory and Florida Water Resource Management. D.R. LECLAIR, Department of Economics, The University of Tampa, Tampa 33606. Since exclusion is nontrivial and its yield is subtractable, water is often viewed a common property resource (CPR). As a CPR, water may be subject to standard externality problems leading to inefficient use. In this paper, Florida's response to such problems is understood and evaluated in the context of modern economic theory. In theory, the institutions and policies in Florida's response are placed between the polar opposites of private and state control and lead to not only inefficient water use, but several other serious problems. Recent proposals to change the current water resource management structure are also examined in the context of modern economic theory.

11:45 am, URP-12A Developing a Cost-Effective, Multi-Source Base Map for Real Estate Due Diligence Applications. J.E. BARNES, Palm Beach County Facilities Planning, Design & Construction, 3323 Belvedere Road, Building 503, West Palm Beach 33406. Utilizing Geographic Information Systems (GIS) as a tool for real estate due diligence evaluation has progressed from being a fad to an everyday operations requirement. While many local government agencies are embarking on the development of a GIS, Palm Beach County's Facilities Planning, Design, & Construction Department (FPD&C) is in the process of compiling multiple source materials in an effort to create a Property & Real Estate Management Information System (PREMIS). This paper summarizes the need for GIS in real estate due diligence evaluations, the procedures for integrating information from various sources, and provides some short, medium, and long term uses of GIS in real estate management.

12:00 pm, URP-13A Location-Allocation Analysis: A Public Works Facility Example. J.E. BARNES, Palm Beach County Facilities Planning, Design & Construction, 3323 Belvedere Road, Building 503, West Palm Beach 33406. In an effort to evaluate the efficiency and cost-effectiveness of operations and maintenance activities within the South Florida Water Management District (District) service area, the District conducted a comprehensive siting and master planning study of its field stations. The siting portion of this study utilized automated mapping and geographic information systems to evaluate the location and allocation of facilities within fixed and non-fixed service areas. Additional geographic information such as land use and environmental factors were utilized to determine the optimal field station location. Results were incorporated into a facility master plan and five-year capital improvement program.

Friday, 12:15 pm
SECTION MEETING - URBAN AND REGIONAL PLANNING
David Black, South Florida Water Management District, Presiding

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60th ANNIVERSARY FUND

The FAS 60th Anniversary Fund has been set up to commemorate the Academy's 60th Anniversary in 1996. The fund will be used to endow research grants for the young secondary school members of our Florida Junior Academy of Sciences. A contribution of $60 is suggested, but any amount will be welcome. Contributions will be recognized during the 60th Anniversary Celebration.

Make plans to join us next year
as we celebrate our

60th ANNIVERSARY

MARCH 4-6, 1996

at

BREVARD COMMUNITY COLLEGE

Melbourne Campus

For More Information,

Contact:

Del Delumyea, Program Chair
(904) 744-3950, X7332

Rita Karpie, Local Arrangements Chair
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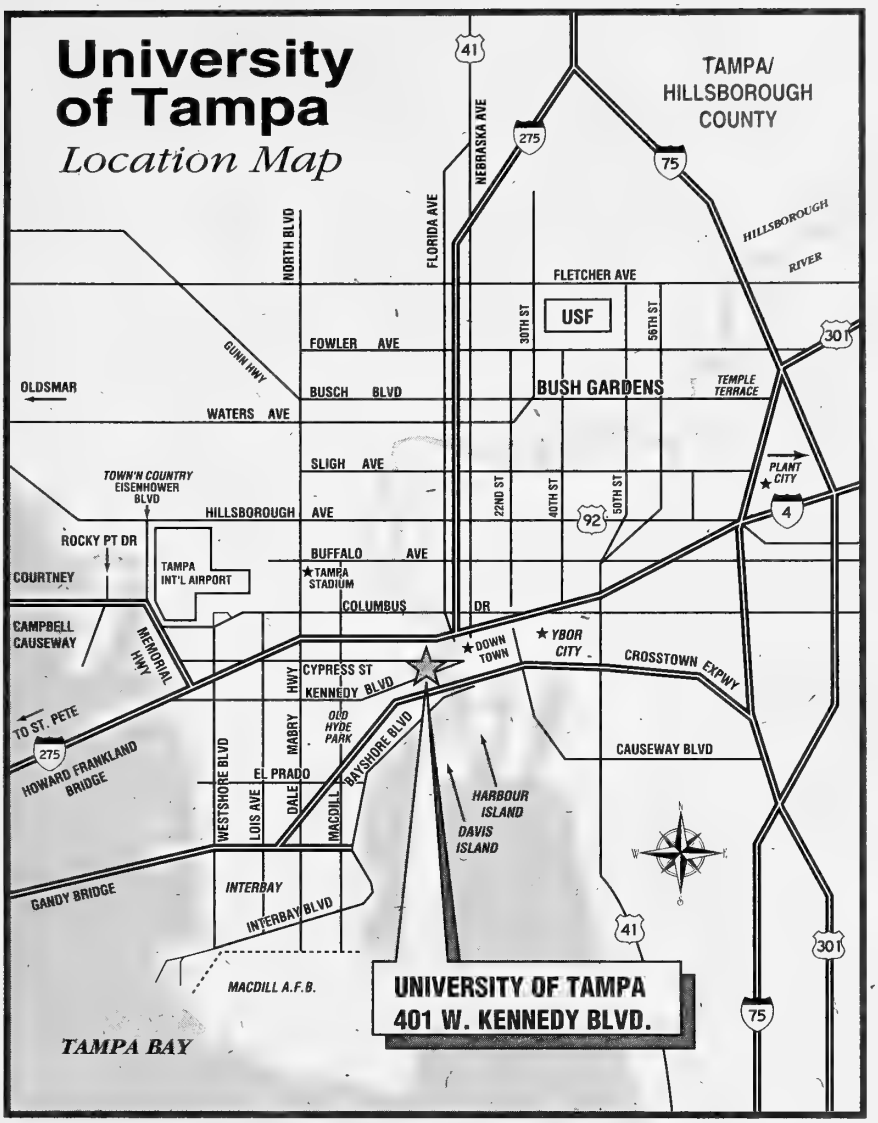
University of Tampa
Location Map
TAMPA/
HILLSBOROUGH
COUNTY
41
275
75
NEBRASKA AVE
FLORIDA AVE
NORTH BLVD
HILLSBOROUGH
RIVER
FLETCHER AVE
USF
30TH ST
56TH ST
301
GUNN HWY
FOWLER AVE
OLDSMAR
BUSCH BLVD
BUSH GARDENS
TEMPLE
TERRACE
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SLIGH AVE
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PLANT
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ROCKY PT DR
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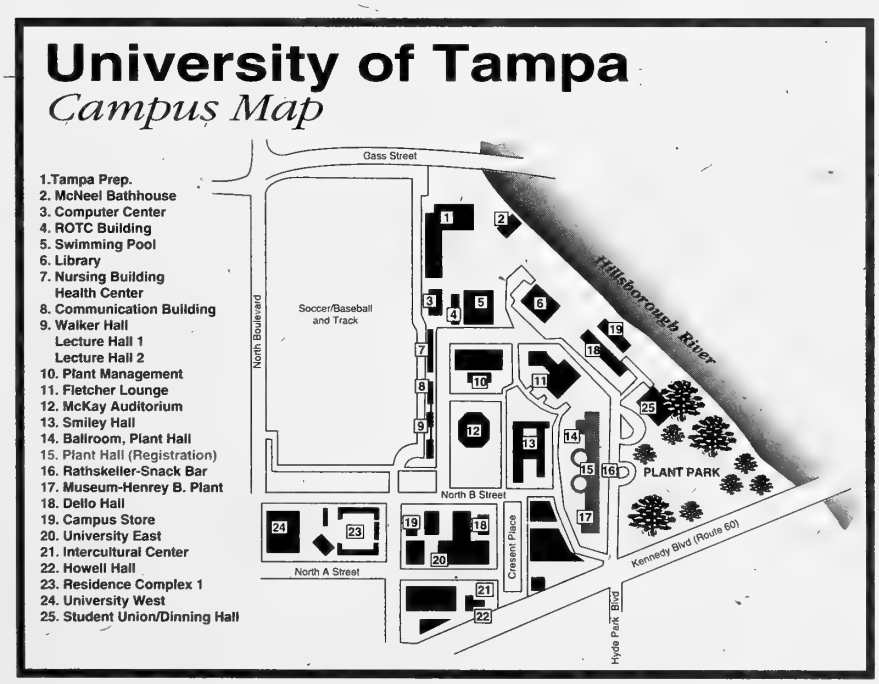
University of Tampa
Campus Map
1.Tampa Prep.
2. McNeel Bathhouse
3. Computer Center
4. ROTC Building
5. Swimming Pool
6. Library
7. Nursing Building
Health Center
8. Communication Building
9. Walker Hall
Lecture Hall 1
Lecture Hall 2
10. Plant Management
11. Fletcher Lounge
12. McKay Auditorium
13. Smiley Hall
14. Ballroom, Plant Hall
15. Plant Hall (Registration)
16. Rathskeller-Snack Bar
17. Museum-Henrey B. Plant
18. Dello Hall
19. Campus Store
20. University East
21. Intercultural Center
22. Howell Hall
23. Residence Complex 1
24. University West
25. Student Union/Dinning Hall
Gass Street
North Boulevard
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